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The 29 case studies in this report seek to define the policies and practices followed by firms in programing technological change and manpower adjustments. The purpose of the report is to make these policies and practices more broadly known and to extend the range of effective adjustments provided by individual managements. The inquiries were conducted and reports prepared through the use of a "Guide for Case Analysis" (appended to the introduction) which was developed by the participating countries including Austria, Canada, France, The Federal Republic of Germany, Norway, Sweden, The United Kingdom, and The United States. The cases were selected to represent a wide variety of types of changes, industries, and firms. Representative case studies are (1) "Integrating Two Foundries" (Austria), (2) "Introduction of Electronic Data Processing in a Canadian Insurance Company," (3) "Concentration in a Nationalized Industry" (France), (4) "Data Processing and Manpower Savings in Public Administration" (Federal Republic of Germany), (5) "Rationalisation of the Norwegian Customs Service," (6) "Administrative Reorganisation of the Swedish State Railways," (7) "Modernisation and Shift Work in a Cotton Mill" (United Kingdom), and (8) "Halving the Work Force in a United States Petroleum Refinery." (HC)

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MANPOWER POLICY

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EDITED BY
SOLOMON BARKIN

technical change and manpower planning

co-ordination at enterprise level

ORGANISATION FOR ECONOMIC
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and "Acceptance and Resistance"
a resume of this study by the Secretariat

REDUNDANCY PRACTICES
IN FOUR INDUSTRIES
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A SERIES OF NATIONAL CASE STUDIES

EDITED BY
SOLOMON BARKIN

technical change and manpower planning

co-ordination at enterprise level

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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INTRODUCTION

The present set of case studies provides the basis for an integrated evaluation of the procedures and tools for " Co-ordinated Programming of Technical Changes and Manpower Adjustments ". Both the case studies and the integrated report are part of a larger programme of investigations by the Manpower and Social Affairs Committee on the " Industrial Relations Aspects of Manpower Policy ".

The central interest of these enquiries lies in the descriptions of the principles and guides followed by enterprises in their personnel and industrial relations policies and practices and how these have been or can be brought into harmony with, or can reinforce, a national active manpower policy. These enterprise policies and practices are essential to an integrated effective national programme. The initial impact of economic and technical change is usually felt on the job. And the greater part of the adjustments are in fact currently effected within the enterprise. A particular organisation reduces the hardships caused to its employees and minimises the amount of redundancy and the burdens placed upon the public authorities and their facilities, insofar as it successfully aids its own personnel to adjust within its own structure. These enquiries seek to define the policies and practices followed by firms, so that they may be more broadly known and employed, and to extend the range of effective adjustments provided by individual managements.

A special merit of these case studies is that they provide a total view of the programme followed by each enterprise to meet a specific or continuing set of managerial, technical and economic changes. A programme of adjustment cannot be tested by whether it has one or other group of benefits, services, or guarantees. Many may be available within an enterprise without necessarily meeting the needs of a particular situation or contributing substantially to the ultimate goal of smooth adjustment to the processes of change.

If the enterprise is to develop an adequate programme, it has tho ave a clearly defined set of objectives, goals, techniques and plans, and a potential or existing organisation for implementing the plans and guides for the adjustment of schedules during the operational period. Moreover its plans and practices should not be conceived independently of the facilities actually available, being planned, or potentially available, in the community, regional or national public agencies. The two programmes, enterprise and public, should complement and supplement each other. There has therefore to be consultation and association between them both to advance their respective policies and objectives and the security, well-being and aspirations of individuals involved. Ultimately, only through co-ordination of the programmes and facilities can one expect to reduce the opposition or resistance to change and lower the amount of industrial friction arising in connection with innovation, and thereby promote industrial productivity and economic growth. From this relationship would develop a definition of the respective roles of the enterprise and public bodies, and the co-operative relations between government, management and trade unions in this field would be stimulated. Each could then discharge the responsibilities it is best fitted to perform.

" INDUSTRIAL RELATIONS ASPECTS OF MANPOWER POLICY "

The present report is one of a number of studies and conferences projected in this field of enquiry, which are designed to increase our knowledge and understanding of procedures, measures, services, and methods of performance within the enterprise, and collaboration between it and the public authorities. The Manpower and Social Affairs Committee has included in its programme provision for studies in the field of public policy and administration. The present group of enquiries provides parallel information concerning experience in the individual enterprise.

Studies in this field have examined the effects of automation upon the attitudes and behaviour of non-manual workers in offices, to parallel a previous study respecting manual workers in the iron and steel industry[1]. Current knowledge concerning the workers' attitudes toward technical change has been summarised in a separate report[2]. A third volume presents the " Redundancy Practices in Four Industries " seeking to determine whether the industrial setting is crucial in deciding the specific programmes needed to meet such redundancy problems[3].

A series of multi-partite conferences and seminars have also been organised to develop the understanding of these problems and current practices. The North American Joint Conference on " The Requirements of Automated Jobs " devoted two sessions to this subject[4]. The 1966 International Conference on " Methods of Adjustment of Workers to Technical Change at the Plant Level " will consider a wide range of aspects in this area.

THE PROJECT AND THE REPORT

The present report is composed of 29 case studies prepared in eight countries on the methods of programming technological change and manpower adjustments. The main emphasis is upon the procedures followed in planning and scheduling the two series of innovations. Interest is centred also on the manner and degree of co-ordination between the two programmes. Has co-ordination between the two been provided ; how was it effected ; and what problems have arisen in the course of the co-ordinated application of the two planning procedures ? What data were collected for planning ? Where were they obtained ? What methods were used to forecast manpower needs and to match these with the existing labour force ? What techniques were applied to adjust the labour force and to mitigate the impact of change ? What procedures and methods were used to revise plans, measures and practices in the light of conditions during the installations ? At what stage and on what subjects were employees and/or their representatives consulted ? What subjects were matters for negotiation and agreement ? What benefits resulted for the enterprise and employees from advanced planning, scheduling and co-ordination ? What supervision was provided for the administration to ensure that the policy objectives were followed ? These are some questions which the case studies seek to answer.

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[1] " Steel Workers and Technical Progress." A comparative report on Six National Studies. EPA Project No. 164, Industrial Version No. 2. European Productivity Agency of the OEEC, Paris, June 1959, 65 pp.

Scott, W.H., " Office Automation : Administrative and Human Problems ", OECD, Paris, 1965, 103 pp.

[2] Touraine, A. and Associates, " Workers' Attitudes to Technical Change ", OECD, Paris, 1965, 177 pp. Acceptance and Resistance : A Resume by the Secretariat of the OECD, OECD, Paris, 1965, 116 pp.

[3] Smith, A., " Redundancy Practices in Four Industries ", OECD, Paris, 1966, 132 pp.

[4] North American Joint Conference on " The Requirements of Automated Jobs and their Policy Implications ", OECD, Paris, 1965, Final report and Supplement, 452 pp.

The plans for this project were developed in the first half of 1963. Member countries were invited to participate in the studies and eight agreed to contribute reports. A Co-ordinating Committee of representatives from each of these countries (generally those responsible for supervising this project or conducting the studies) met in Paris in July 1963 to review the line of enquiry and the plans for the conduct of the studies. A " Guide for Case Analysis " was approved and uniform rules for the conduct of the investigations were developed. Continuing co-ordination during the course of the enquiry was provided by the OECD Social Affairs Division. A copy of the " Guide for Case Analysis " is appended to this Introduction.

The individual cases were selected by the specialised research agencies in co-operation with the Ministries of Labour, or the persons responsible for the supervision of their investigation, and the OECD Social Affairs Division. One United States study was contributed on invitation. The cases were selected to represent a wide variety of types of changes, industries and firms. At the same time it was believed desirable to have several national cases on the same industry such as steel, textiles and telephone and telegraph to provide a basis for direct comparison. The cases relate primarily to reductions in the labour force rather than to the establishment of new plants.

Most of the field studies were carried out at the end of 1963 and during 1964, although some were continued into 1965. The reports were submitted during the latter two years.

Most cases are based on original investigations initiated specifically for this purpose. A few of them are reports based on a re-examination of existing case studies according to the outline provided by the " Guide for Case Analysis ". In all some forty were submitted.

The analyses reflected the interests of the investigator, the special concerns within the particular countries, and the distinctive characteristics of each case itself, whilst the reports reflect in part the type of information available in the particular case. All, however, followed the " Guide for Case Analysis ".

The reports varied in size, terminology and emphasis. The cases selected for inclusion in this report were chosen after consultation with the responsible agencies because they have an intrinsic interest and value, provide representation for each participating country and supply comparative materials for similar industries. The reports were condensed to make them more comparable, readable and useful, and in view of the differences in institutional practices, a standardised terminology was employed to facilitate understanding and comparisons between countries. The presentation is relatively uniform although adjustments have had to be made to the individual reports. The summary in each case retained the author's emphasis and point of view. All judgments expressed in each case are those of the author of the original document. The texts of the summaries were reviewed by the national authorities and authors who contributed them, for accuracy of presentation.

At the beginning of each country chapter, the editor has added a short introduction which gives the main points of the country's case studies and the persons or groups responsible for the preparation of the report. Each case study includes an introductory statement about the firm or industry involved, the nature of and reasons for the change, and information on the consequences of the change on the labour force. There then follow three sections, dealing with the planning procedures, adjustment programmes and finally the forms of consultation management employed with its employees and their representatives. There is no overall summary of the conclusions based on this investigation as an integrated evaluation is contained in the final report.

Several findings may, however, be noted with profit. The planning and introduction of new investments and the implementation of changes in production and operations can be co-ordinated with the programming for the adjustment and recruitment of manpower in an enterprise, with benefit both to the latter and its employees, without interference or costly adaptations to the programmes for business changes. Moreover, whilst medium and long-term planning of manpower operations are feasible, the administrators should retain the possibilities of adapting them to new developments and operating needs. Such flexibility will be facilitated by long-term planning and careful study in defining objectives and alternative tools, techniques and procedures. The formulation of a system of adjustments in advance of the changes also helps in co-ordinating technical change, and moreover tends to create an established procedure and common outlook between the people responsible for the innovation and those primarily concerned with the impact on manpower. It is particularly helpful to those who carry both responsibilities since it enables them systematically to take account of the imperatives both of the organisation as an institution and of the people employed in it. Each system of adjustment should contain a variety of tools and techniques, since changes are usually continuing and diverse and the best method of adjustment may differ.

The long-term results of careful planning of adjustments and co-ordination of the two programmes of change appear to be greater acceptance to change by employees and therefore lower resistance ; these favourable attitudes will continue to be associated with real efforts at hard bargaining on the sharing of the benefits of these changes. Continuing consultation and active participation by employees and their representatives in the process of effecting change, and the terms and conditions under which they are performed, reinforce this positive disposition to change. Careful planning of such changes permits enterprises both to make the best use of public facilities and to co-ordinate their programmes with the services to be provided by the public agencies either to the enterprise or the employees.

We wish to thank the national authorities and organisations responsible for the studies and the authors who prepared them for their efforts and contributions and their co-operation in the preparation of these edited versions of their reports. Mr. Erwin Kempf has assisted in the administration of the project and Mrs. Joan Henderson in the preparation of the summaries.

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GUIDE FOR CASE ANALYSIS

The primary object of the case analysis is to provide a basic description of the *procedures* followed by a particular enterprise in programming its manpower adjustments along with the planning and scheduling of its technical changes, to enable it to effect them with a minimum of disruptive effects on, and with the greatest benefit to, its existing work force. The analysis should unfold both the *original plans and the modifications or revisions made* in them in the course of the installation of the technical innovations.

The items listed below indicate those aspects of the procedures which are most relevant to the main interest of this analysis. They will not apply in each instance nor do they set limits on the areas to be covered. The items focus primarily on the *procedures* of integrating the programming and scheduling of manpower adjustments with the planning and timing of the technological change itself. *The principal purpose of these inquiries is indicated by the first question under each heading.* The remaining questions spell out a possible range of questions to be followed under each heading. *They form a guide and not a prescription of the detailed contents of the case analysis.*

Each case analysis should be presented separately and the name of the company may be indicated by letters rather than actual name. An introductory background note would be helpful for each case to provide an understanding of the nature of the firm, its activities, economics and industrial relations.

1. PLANNING TECHNICAL CHANGES

Were the technical changes substantially new in the industry or had they been previously tried out in other areas ?

Were the machines and processes developed or especially designed for this enterprise or were they commercial, available in relatively standardised form ? Were basic and considerable changes necessary in the technologies or machines in the course of installation ?

2. ASSESSMENT OF NEW MANPOWER REQUIREMENTS

What methods were followed for forecasting the qualitative and quantitative manpower requirements in post conversion periods ?

Were job analysis studies carried out on new jobs ?

Was manpower forecasting based on data about job distribution in pilot workshops or services ? On information provided by equipment manufacturers ? Consultants ? On what other source ?

Were tentative manning tables drawn up ?

Was a detailed plan drawn up showing the breakdown of the labour force by function and by operating group for each step of the conversion process ? Provide, if possible, full details about manpower forecasting methods and procedures, including levels and persons in management who were consulted.

Were plans made for the use of the establishment's own force for the installation of new equipment ?

To what extent did these studies allow management to forestall manpower adjustment problems, for example, by allowing it to formulate hiring and lay-off policies at an early stage in the pre-conversion period ? What was the effect of these forecasts on conversion planning and timing of the technological changes ?

3. DEFINITION OF REQUIRED MANPOWER ADJUSTMENTS

What methods were adopted for defining and enumerating the required manpower adjustments as to type, numbers, qualifications and locations in the light of the manpower resources existing before the introduction of changes ? Describe these methods for advance identification of manpower adjustment problems and areas.

Were feasibility studies made of the technological conversion plans from the point of view of the current manpower resources ? Were decisions made on the need for the recruitment of outside personnel ?

What other specific procedures were followed in the initial evaluation of the probable personnel implications of technological changes ?

How did the early determination of requisite manpower adjustments permit advanced planning and action on adjustments for the re-assignment or relocation of the permanent staff in advance of job elimination ; how did it facilitate the granting of advance notices to staff members who were to be separated, and the retention during the transition, of people likely to be pensioned ? In what other ways did it help define manpower objectives and methods of adjustment ?

4. TIMING OF INTRODUCTION OF TECHNICAL CHANGES

What time schedules were adopted for the introduction of technical changes ?

What were the various considerations underlying the scheduling of the conversion process ? Describe in detail the technical planning and timing, and show how co-ordination was achieved with manpower adjustment programmes.

What was the specific role of various members of the management staff, especially those responsible for personnel policy, in decisions on the timing of the conversion ? How did personnel objectives and targets precisely affect the scheduling of the changes ?

Were the unions or employee representatives consulted on the scheduling of the introduction of the technical changes ?

5. INFORMATION AND CONSULTATION OF EMPLOYEES AND LABOUR REPRESENTATIVES

What types of information were communicated to the staff at various levels, and through what channels ? the executive channels ? the consultative channels ? the unions ? Which information media were used and for what specific purposes ?

What were the principles underlying the personnel information policy ? Who assumed central or specific responsibilities for staff information policy ? What attitude was observed in case of idle rumours liable to exert adverse psychological effects ? What type of information was not transmitted to avoid arousing unnecessary anxiety ? What special information techniques were used ? Was the individual interview procedure adopted for reassuring personnel members about their future situation ? Was the staff kept informed of job openings before any definitive assignment was made ? How ? Was overall information about retraining and other facilities part of total information policy ?

What were the specific roles of the joint consultative bodies and workers' representatives in shaping and implementing the conversion and manpower adaptation policy ? Was joint consultation and workers' representatives' machinery only used for problem-solving tasks after grievances or resistance had occurred ?

Once conversion and other plans were reviewed and approved by the executive system, were the labour representatives advised of the progress, and was a preliminary understanding on the basic principles respecting changes affecting labour sought with them ?

6. PERSONNEL REDEPLOYMENT PROCEDURES

Indicate the fact-finding, decision-making and consultation procedures for planning staff redeployment and reassignment.

Was a task force set up to prepare the redeployment policy ? Were previous policies, procedures and facilities sufficient to meet the deployment programme ? What changes were made ?

Furnish details of redeployment plan and objectives

Did the redeployment plan provide for specific re-employment opportunities for the affected employees ? What personnel objectives guided the conversion process ? What general or specific guidelines were issued to define the techniques and methods to be used for employee redeployment. Were special procedures worked out to allow maximum flexibility in redeploying personnel ?

Point out the respective roles and responsibilities of staff and line executives at various levels of authority in the selection and transfer procedures. What personnel selection data and methods were used ? Records of employees' qualifications and skills ? Specific selection tests ? Include form of employees' qualification records. Which selection criteria were followed ? How were they determined ? How implemented ? How did age distribution, as a criterion, influence workers' re-assignment, retraining programmes, pension plans, job redesign ? Point out to what extent workers were offered choices as to transfer during the conversion process ?

What procedures were followed for assuring maximum utilisation of the potentialities of existing staff ? Were job openings posted in departments prior to any new hirings ? What special techniques were used to avoid personnel separation, such as temporary re-assignments to new job openings ? Were specific guidelines issued in respect to the placement of special categories of workers, such as older staff members, handicapped workers ?

7. Vocational Adaptation and Job Design

Describe the programmes and the timing or the vocational re-adaptation and training of the personnel.

Was a task force, technical committee or training department entrusted with these programmes ? How was it composed ? Were job studies carried out prior to the formulation of curricula and training schemes ? Was training given in schools or a pilot plant, or outside operation, or by installing engineers, or how ?

What principles as regards pedagogical methods and learning processes underlay the training methods as programmed ?

If on-the-job training was provided, was supervisory staff prepared for assuming pedagogical functions ? Why and in what cases was preference given to off-the-job training ? What particular experiences were gained as to the efficiency of the training methods and procedures ?

Were special training materials and aids prepared ? Operating procedure manuals ? Troublesome identification manuals ? Audio-visual aids ?

How were trainees selected ? Through vocational guidance interviews ?

What learning results were possible through the methods adopted ? In view of the technical conversion, were part of the employees successfully retrained for an entirely new trade or skill ?

What wages and benefits were paid to trainees ?

In order to ease the adjustment process, did management have recourse to job (re)design ? Was work simplification introduced to fit the jobs to the skills, age, or aptitudes of the labour force ? Describe the task redistributions effected with a special view to realising the adaptation of jobs to the available manpower resources. How was the status of some jobs enhanced, for instance in order to raise job satisfaction ?

8. SALARY AND WAGE ADMINISTRATION

To promote employee acceptance of changes, were income guarantees given ?

Were guarantees on personnel's share in the benefits of changes negotiated ? Were all employees granted a minimum hourly rate equivalent to past earnings ?

How was the change-over from one wage payment system to another effected ? How was the employee's agreement sought and obtained ?

Was the wage-level for new jobs fixed on the basis of job analysis ? What policy was followed to avoid wage reductions for employees transferred to lower graded jobs ? Progressive wage and salary adaptation ?

Did some employees suffer a reduction in earnings ? Was any provision made for them ?

9. OTHER ADJUSTMENT PROGRAMMES AND PERSONNEL POLICIES

What other programmes were developed for promoting the adjustment of employees affected by the conversion ?

Describe these programmes and show how they were implemented.

For instance, were special facilities and assistance to geographically relocated employees planned ? Were their transport and moving expenses paid ? What was the role of the enterprise's welfare or social service in assisting these employees ? Were their settlement and accommodation in their new location and environment facilitated ? What specific action was planned to remove major obstacles to their mobility ?

What was done to ease the hardships of redundancy (permanent separation) ? Did management develop a redundancy scheme ? Was a management-union redundancy agreement concluded ? What separation procedures were adopted ? Early warning, special assistance in seeking other work, advance information and co-operation with employment services for replacement of redundant workers ? What criteria were adopted for assuring fair selection of workers to be affected by work force reduction ? Were they granted compensatory payments, preferential rehiring rights, anticipated pensions ? Describe redundancy payment system.

What other personnel policies were designed, for example, for keeping the work force in balance with manpower needs during the conversion period ? Advanced or delayed retirement ? Temporary hirings ? Overtime work, etc. ?

10. SUPERVISING, ADMINISTERING AND REVISING THE MANPOWER ADJUSTMENT PROGRAMMES

What systems of internal supervision of application of programmes were in operation ?

Were revisions made of redeployment and adjustment plans in the light of experience ? Of what nature ?

11. EVALUATION OF EFFECTIVENESS OF PROGRAMMES FOR MINIMISING THE ADVERSE EFFECTS OF TECHNOLOGICAL CHANGE FOR CURRENT EMPLOYEES

Assessment in terms of occupational situation of labour force after change (upgrading, replacement, wage level, transfers, physical and mental strains of jobs, etc.).

Assessment in terms of employees' attitudes, behaviour and reactions as measured by grievance frequency, turnover rates, absenteeism, accident rates, relearning curves, training successes, restriction of output, conflicts, etc. If possible, obtain independent assessments of management, unions and employees.

12. ROLE OF GOVERNMENTAL AGENCIES AND SERVICES

Indicate public agencies, services and facilities used at any stage of the planning or the redeployment procedure.

Chapter I

AUSTRIA

INTRODUCTION

The Austrian case involves a nationalised iron foundry in which two plants which had been 40 kilometres apart were merged into a newly built modern plant with the flow line system of production and many new machine processes replacing older manual ones. The study was prepared by Dr. George Michel of the competent department of the Federal Chancellory in co-operation with the firm's management, following the OECD Social Affairs Division's " Guide for Case Analysis ".

The planning group consisted of the firm's engineers together with the representatives of the firm making the installation. The committee also drew up staffing plans after visiting a number of plants both within the country and abroad, and a timetable for the installation. A running-in period was provided as a number of the working processes were new to the staff.

It was anticipated that there would be a reduction of one hundred people, cutting the staff from 340 to 240 persons. But, in agreement with the union, an assurance was given to employees that no persons would be laid off and that all persons would receive jobs of similar nature at not lower rates.

Each person at the plant being completely closed was interviewed and his preferences ascertained for transfer to the new plant or other plants of the company. The additional travel costs were covered by the company. About one quarter of the employees resigned ; about one-half agreed to work in the new plant and the remainder accepted employment in other company plants in the old community. Visits to the new plant were arranged to familiarise employees and their families with the new place of employment. On the whole little training was required and such as was needed was largely on-the-job.

The management had discussed the details of the change with the works council and the union after the decision was taken. These deliberations proved very helpful in solving many problems of adjustment.

The merger of the two work forces presented a number of problems which were overcome during the course of the first year.

Case I

INTEGRATING TWO FOUNDRIES

I. Introduction

On 1st January, 1959, this iron foundry in A acquired an iron foundry from another firm in B. From this time on, the foundries worked as one economic unit with two processing plants. The unfavourable business position of the B foundry improved after a short while with an ascending business cycle.

1. *Amalgamation of two plants.*

When considering rationalisation of production in the whole enterprise, the management decided in 1961 to amalgamate the two foundries since, from the long-term point of view, there was no point in modernising each of them separately. A major factor in this decision was the recognition that the foundry industry was already heavily represented in Austria.

The distance between the two factories was 40 km. The staff in each plant was 170, a total of 340 persons of whom 36 were white-collar workers.

Construction and modernisation of the foundry at A was started immediately. Space thus becoming available in plant A was reserved for the transfer of an instrument factory from C. After completion of the new building, the amalgamation was effected on 23rd September, 1962. The merging of the two iron foundries of similar structure into one complete unit was thus realised.

The next aim was to reduce the personnel while keeping output at the same level. This was to be achieved by the thorough mechanisation of the new plant.

2. *New automatic equipment.*

A planning committee of the enterprise determined the targets for the new plant in coordination with the projection office of the firm in charge of mechanisation (the latter having its headquarters in Poland). The new equipment was to be so designed as to absorb, after installation, the production capacity and the various casting processes of the former two plants without any interference. To introduce a rational system of flow lines and stations, investigations on mould machines and form casting equipment were initiated. To this end, a large measure of standardisation of equipment was required and manifold production equipment aids had to be discarded. Planning was complicated by the fact that owing to the limited funds available for investment it became necessary to incorporate the old moulding machines into the mechanisation process, though a later renewal of this machinery had been taken into consideration. When the final blueprints were available, plans for machinery and staffing (actual and target) were drawn up.

Where the new plant differed from the two old ones was that the entire sand processing was automatic, and machine moulding proceeded on flow lines, whereas formerly these had been manual processes. Hand moulding remained unchanged. This necessitated an entire reorganisation of the smelting and casting processes.

While mechanisation of the moulding process is a familiar feature, automatic sand preparation of four different types of sand was, for Austria, an innovation. The working process was therefore a complete novelty for the staff from both plants, and the flowing line, even in any similar form, was something about which they were totally ignorant. It followed that a prolonged initiation and running-in period had to be expected.

3. *Timetable.*

When the time of moving approached, a timetable was set up to permit the transfer of production and labour force. Involved were approximately 3,000 tons of material, installation, etc. as well as approximately 4,000 model installations which had to be moved.

The clearing out of the plant in B and the transfer of processing machinery and installations were set to take place during the two plants' annual vacation (July 1962) so as to assure smooth proceedings of transport and transfer operations.

When on 23rd September, 1962, the transfer of staff took place, the last kilogramme of casting had been delivered from B, and all necessary machinery was installed in A. All that was left in B were installations and mounted equipment which needed dismantling and converting into scrap on the spot or to be put up for sale.

II. MANPOWER CHANGES

1. *Planning manpower needs.*

Before the new plant was opened, similar plants at home and abroad were visited and studied. In collaboration with the manufacturers of the mechanised equipment, specific manpower requirements were worked out as a preliminary condition to accomplish the aim of rationalisation. In the machine moulding department, new norms of real output capacity had to be taken into account as transportation had been made superfluous by the flowing lines.

The overall production process was broken down into individual phases and the target staff was calculated. It emerged that the number of available staff exceeded the target figure by 100 persons. The enterprise had, before the merger, committed itself to a pledge to provide employees with jobs of similar standing, and it therefore became necessary to examine each individual case. Since a considerable surplus of available manpower existed, the task was made somewhat easier and extensive retraining from one job to another was largely avoided. It was necessary instead to prepare the workers for the entirely new working process.

Every single position was investigated and incorporated into one uniform manning table. The need to devise such a table well in advance was obvious if one wanted to find out which 100 persons in B could be left out of the new plant. Since these persons had to be placed in other branches of the company it was important to determine and harmonise the available skills.

2. *Redeployment of manpower.*

Each employee was asked individually whether he would like to join the new plant or would not object to a transfer to one of the other plants of the group of companies in B. A decision was facilitated by the fact that in foundry B there were only 12 trained skilled workers (hand moulders) while all other employees had acquired their skill on the spot. If necessary, they could well be placed in one of the other plants.

The examination revealed that there were three groups :

a) 65 individuals who refused to go into the new plant and wished to work in one of the group's other plants in B.
b) 40 who wished to leave.
c) 75 who agreed to the amalgamation and were willing to commute the 40 km. daily by bus. These were in fact transferred to A.

III. INFORMATION AND CONSULTATION

When the merger of the two plants was definitely decided upon, the union leaders and the works council were called in to be told exactly what was going to happen. After an assurance that no employee would lose his job and that further no-one would get a new job monetarily inferior to the one he held at present, the union and the works council gave their consent to the plans.

At a works meeting the management made known its intentions. In order to give employees ample time to make up their minds, the above talks were started as early as the beginning of 1962. Surprisingly enough, the plan was accepted with great understanding helped by an excursion to the newly constructed plant by the members of plant B. Here, everyone could convince himself personally about the advantages of the new plant. The plant inspection was combined with an outdoor picnic with the employees' families participating. This psychological preparation contributed greatly to counteract any misgivings or doubts of those who were wondering whether to opt for the transfer or not.

Since the excursion also included a trial bus run from B to A, it was possible to gauge the exact time the daily trip would require, three months in advance.

Evidently, the last few months prior to the transfer were somewhat depressing, resulting in a lowering of the morale at work. There were many rumours in circulation — some good, some bad — according to each individual's point of view.

The co-operation of the works council was an important aid in establishing a liaison between management and staff. Thus many problems involving social hardships could be ironed out to everyone's satisfaction. Those who voluntarily wished to terminate their employment received all money due to them up until the end of 1962 so as to avoid any hardships.

The group having opted for a transfer to other plants was given a chance to visit their future working environments beforehand.

IV. ADAPTATION

It fell to the works administration, after the new plant had gone into operation, to unite the two former working-groups — strange to each other — into one single team. This was not always an easy matter since both plants had their deep-rooted traditions of the past. The entirely new working process created additional problems since the technical installations did not, at first, function too well. The new flow line process also necessitated the retraining of several employees, in particular older persons, who were unable to adapt themselves to flow line conditions and had to be transferred to other positions. The granting of bonuses for increased output on the flow lines constituted an added incentive.

A move to wear identical work suits was well received and contributed, optically at least, to an accelerated merging of the two working groups. Influences from outside the enterprise were negligible.

For the 75 employees who were to commute daily to plant A (1 hour's travel each way) the travelling represented, of course, an added inconvenience since most of them were living near their former plant. The bus charges were entirely and without question borne by the enterprise.

The climate in the new plant was at first rather tense. The fact that the plant management was fully occupied in remedying initial mechanical defects aggravated the situation, since there was no time left to extend psychological guidance to the employees.

The works management had calculated on 4 to 6 months for the transitional running-in period. This time span proved to be too short. It was only after about 12 months that the working process and human teamwork started to function normally and smoothly. Rejects, which before mechanisation amounted to about 7 per cent, rose during the first few months in the new plant up to 15 per cent, but dropped below 7 per cent after a 12 month period. Likewise the " getting acquainted " period among workers took longer than anticipated, although staff employees had practically no difficulties in this respect.

At present (after 18 months) there is hardly any trace left of the former two working groups. The climate of work can be considered to be normal and good.

Chapter II

CANADA

INTRODUCTION

The Canadian case relates to the introduction of the first electronic data processing system in an insurance company for the purpose of meeting the growth of business and improving the speed of service and record keeping. It affected both the central and branch plants. The system was first applied to the ordinary life insurance department where the installation difficulties protracted the breaking-in period. The application in the group life department followed a step by step procedure. Conversion of other branches was to follow later.

The report was prepared by the Economics and Research Branch of the Ministry of Labour on the basis of its field investigations.

The installation was preceded by a feasibility study made by a group of company employees and the delay of two years between the placing of the order and the delivery of the machinery allowed for considerable preparations. The Personnel Department handled the adjustment problems. The company determined to employ its regular staff for making most of the conversion and, to smooth the adjustment, counted on turnover among its young female workers who would be most affected. In fact, actual total employment increased with the further expansion of business. Little need was therefore foreseen for careful advanced planning and the company depended on ad hoc adjustments envisaging that transfers would take care of most people. Temporary and part-time clerical help was hired to relieve bottlenecks and temporary promotions were also used to fill jobs. To meet the potential unrest, employees were assured that all those displaced would be found other jobs and given the necessary training and guarantee of no reduction in salary, although in some cases earnings might be frozen. New recruitment was limited. A few elderly women are reported to have left and difficult cases were handled individually.

Employees were informed early on about the installation, and explanatory sessions were organised to keep them informed of developments. Orientation programmes were arranged to acquaint senior staff with the principles of the new system. Only people on technical electronic processing assignments had to be specifically trained.

Case I

INTRODUCTION OF ELECTRONIC DATA PROCESSING IN A CANADIAN INSURANCE COMPANY

I. INTRODUCTION

1. *The company*

The company reported on here is a large, privately owned Canadian insurance company. Its business is in ordinary and group life insurance only. Business has increased at a constant rate over the past few years. In 1955, three years before the introduction of electronic data processing (EDP), there were 338,000 ordinary life policies and 1,600 group life policies in force ; by 1958, these figures had increased to 359,000 ordinary life policies and 2,100 group life policies ; and in 1961, three years after the introduction of EDP, the company had 366,000 ordinary policies oustanding and 2,400 group policies.

This increase in business is also reflected in total employment figures (excluding insurance agents but including branch office personnel) over the same years. In 1955, there were 824 employees (230 male and 594 female); in 1958, there were 957 (254 male and 703 female); and in 1961, there were 1,089 (331 male and 758 female). The large proportion of female employees to male employees is typical of the insurance industry in Canada where a large percentage of the jobs involve routine clerical work.

It is impossible to estimate to what extent total employment might have had to be increased to handle the increased work load if EDP had not been introduced.

2. *Planning technological changes*

Early in 1955, it was decided to investigate the possibilities of electronic data processing for the company's operations and, if at all feasible, to become the first Canadian insurance company to use these new data processing techniques. Two men — one an accountant and the other an actuary — were chosen from management level to investigate the possibilities of using EDP methods in processing the work of four areas : Ordinary Life, Group Life Investments and General Accounting. To help them prepare a preliminary feasibility report in September 1955, they recruited 14 of the company's best men from the various departments whose work systems were to be analysed.

Upon the acceptance of this report by the company's executive in November 1955, the 16 man Research Group began a more detailed feasibility study, which was submitted and approved by the company's senior executive the following September. The order for the purchase of a large-scale computer, for delivery in July 1958, was then placed. This meant that a period of approximately two years would elapse between order and delivery of the computer. The advantage of this time lag was that the interim period could be devoted to planning and programming the various applications.

The Research Group suggested that the work in all four areas investigated was adaptable to a large-scale EDP system, and that by combining the work functions of these areas, annual savings of over $ 400,000 could be expected.

The Research Group further suggested that the greater part of the conversion work could be handled by the company's regular staff. In addition to those associated with the Research Group, the direct assistance of key personnel of the various departments affected by EDP would be used for this purpose.

The introduction of electronic data processing meant that certain equipment previously used by the company in processing and servicing its Ordinary and Group Life policies could be eliminated. Once all areas of the company's business were on the computer, the following equipment could be done away with : (*a*) the entire punch card installation, (*b*) the entire addressograph installation, and (*c*) 17 bookkeeping machines, 26 calculators, 7 comptometers plus various typewriters and adding machines.

During the summer of 1961, a one man follow-up study was conducted by the head of the data control department. The purpose of the study was to report on the efficiency of the system as it was then operating, and to recommend any changes which might improve the system. This study supported the conclusions of the original feasibility studies in that overall economies would be achieved with the new computer system ; however it suggested that it would still be a few years before the system would be operating at lower costs than the previous system. The follow-up study further suggested that the new EDP system did permit overall improvements in the service given to the company's clients and to its field and branch office staffs. The major improvement in service was in the area of timing. Operations were now being performed closer to the required dates and consequently the information was more up-to-date.

3. *Timing of introduction of technical changes*

At the recommendation of the Research Group, plans were made for the conversion to the computer of four areas of work in stages, over a period of several years. The first application was to cover the whole of the Ordinary Life work, and was to be operational by January 1959 — six months after the computer was delivered. The reason for programming the whole of this work in one application rather than in smaller individual steps, was the integrated nature of the various processes.

The Ordinary Life application was ready by February 1959, only one month behind schedule. The company quickly discovered, however, that it had taken on too much. Countless errors appeared, resulting in thousands of policyholders being incorrectly billed and hundreds of agents not receiving their correct commissions. By mid-1959, the company had been forced to adopt a form of parallel operations, using other records to check the accuracy of the computer output. It was not until early in 1960 that the Ordinary Life EDP system began to function properly.

Scheduling for the planning and programming of the computer applications for the other work areas of the company was never spelled out in the original feasibility studies. However, early in 1959, just after the Ordinary Life application was put onto the computer, the company began planning for the Group Life application. The difference here, however, was that the work was being transferred in steps rather than all at once. The reason is not only that the company learned its lesson with the Ordinary Life application, but that this time the company was in no rush to become the first insurance company in the EDP field. Furthermore, most of the key EDP men were still tied up with the Ordinary Life application and there simply was not the personnel available to plan and programme the Group Life application. By 1st July, 1962, about 60 per cent of the Group Life work had been transferred and the remaining 40 per cent was to be transferred by December 1963.

Future applications include group pensions, information for management, integration of the Ordinary and Group Life ledger accounting, annuities and operations research. As at 1st July, 1962, no plans had been made as to the timing of these applications, and no priorities had been given to any of them. Although the company's work in mortgages and investments was considered a feasible application in the original studies, further investigation has shown that they cannot be justified.

II. ASSESSMENT OF NEW MANPOWER REQUIREMENTS

1. *Long-range estimates*

According to the estimates made by the Research Group in 1956, the introduction of EDP methods would result in 260 positions being eliminated while creating 165 additional positions, 72 of which would be in the proposed EDP departments themselves. If these forecasts are realised then there will be a net decrease of 95 in the number of jobs at the company's head office. In addition, there would be an estimated saving of 74 positions in the branch offices. These estimates are based on the ultimate use of the computer equipment in all of the company's major processing routines, which would involve a minimum period of conversion of five years.

The methods by which the forecasting of the company's manpower requirements was made were never clearly delineated in the Research Group's final report. However, each of 19 departments whose work system was to be affected by EDP was carefully scrutinised by the representatives of the Research Group familiar with those areas. Then estimates were made of the number of jobs whose work would be taken up by the new computer system, and the number of jobs which would be created as a result of it.

Of the 260 jobs to be eliminated by the new EDP system, 226 were at the more junior clerical levels. However, it is among these positions that the company experiences its greatest turnover (about 20 per cent annually), usually through women leaving to get married or to raise a family. Furthermore, these are the individuals who are most easily transferred to new positions. This has eased considerably the manpower adjustment problems.

A breakdown of the level of new jobs created by the system is available only for those positions within the new electronic data processing departments themselves. Once again the biggest positive employment impact is among the more junior clerical jobs ; most of these new positions are to be found within the data origination and control areas and in the computer operating room.

2. *Accuracy of estimates*

The accuracy of the forecasts made on the number and types of jobs eliminated by the new system cannot be ascertained. However, by looking at employment data from 1957 for the various EDP departments which have been set up, one can get some indication as to the validity of the forceasts made on EDP personnel. The table below shows actual EDP personnel employment figures for selected years from 1st January, 1955 to 1st July, 1962, in addition to the long-range estimates made by the Research Group in 1955-56. (The figures exclude supervisors and administrators).

	1955-56 FEASIBILITY STUDY ESTIMATES	Jan. 1955	Jan. 1957	Jan. 1958	Jan. 1959	Jan 1961	Jan. 1962
Programming and Systems Development	7	1	18	21	22	29	25
Data Origination and Data Control[1]	36	1	10	55	88	117	109
Computer Operation	16	–	–	6	9	12	12

[1] Includes typists, receptionists, keypunch operators, tabulating equipment operators, data origination clerks and data control clerks.

As can be seen, the original estimates of EDP personnel required by the company were highly inaccurate. It is true that the actual employment figures are somewhat inflated from what they normally would be once all planned applications were operating, but one would expect this to reflect itself mainly within the systems-programming area. Estimates by knowledgeable company officers are that the maintenance staff of programmers required, even after all applications had become operational, would still run between 20 and 24.

3. *Defining manpower requirements*

This company is similar to other insurance companies who have introduced electronic data processing in that very little attention was apparently paid to defining precisely the manpower adjustments the new computer system would require. Rather the approach used was of an *ad hoc* nature where individual adjustments were handled as they arose without any forward planning.

The general areas of employment impact and work change were set out in the original feasibility study for the new system. Certain departments within the company (e.g. Premium, Dividends and New Business) were to be completely eliminated while others were to experience staff reductions (e.g. Addressograph, Tabulating, General Ledger and Policy-owners' Service Departments). Still other departments (e.g. Valuation, Records and Calculation) were to have their work load and staff increased as a result of EDP and new departments (e.g. Data Processing Programming, Systems and Computer Operating,) were to be created. However, the nature of the employment structure of the insurance business, where the bulk of the labour force is engaged in routine clerical processing work, and the fact that the major impact of EDP would occur in departments manned by routine clerical personnel, meant that detailed planning for manpower adjustments was not deemed necessary.

As previously pointed out, the major portion of jobs eliminated were of a junior clerical nature where there is the greatest rate of employment turnover. Hence a large proportion of the job reassignments and transfers which might otherwise have had to be planned were eliminated through natural wastage even before they arose. Furthermore, those who remained with the company throughout the conversion period and who had to be transferred were put on similar clerical jobs within the newly created data origination and data control departments.

A company policy which eased the conversion was the hiring of temporary clerical help to assist in the heavy work load brought about by the conversion and to keep all positions filled until the conversion was completed.

A combination of all these factors meant that the company has been able to handle the small number of manpower adjustment problems as they arose. Usually each case would be referred by the people in personnel to the head of the new EDP Data Processing Department, who would attempt to fit the individual concerned into a suitable position where his ability could best be put to use.

III. Information and consultation

Officials interviewed at the company all agreed that there was a moderate degree of apprehension amongst employees about the prospects of the company acquiring a computer. This apprehension was particularly prevalent amongst the senior supervisors who failed to understand what EDP meant but who realised that it was going to take over their areas of responsibility. This apprehension was confirmed in February 1959 when the Ordinary Life system broke down. Before this, employees' apprehension remained dormant, but now employees began to express openly not only their personal fears but also their doubts about the ability of the new computer to do the job.

The company had attempted to forestall apprehension at an early stage. In the first place management explained what the new EDP system was and what it was going to mean in terms of jobs affected. Those jobs which were to be eliminated were specifically identified as far as possible, and everyone was promised another job if displaced from their present one. Furthermore, everyone was told that there would be new positions opening up as a result of EDP, including programming and console operating positions, and that all employees would have an opportunity to qualify for these new positions before the company recruited personnel from outside. All employees transferring to new positions were promised whatever training was necessary to fit them for such positions ; they were also promised that there would be no decrease in salary as a result of any such change, although in some cases it might be necessary to assign employees to positions at lower grades. However, employees were warned that although their old salary level was guaranteed, they might have to accept a temporary freezing of their salary level.

From the very beginning in 1955, employees were kept informed of developments and the progress of the new system. The more senior personnel (from the supervisor level and up) were given short orientation courses on computers and electronic data processing to familiarise them with the hardware and what it was capable of doing. Such an appreciation of the new system, and how their own work functions were to fit into it, was necessary in order to assume a smooth-running operation. All the managers of branch offices were brought to head office in a group and the whole EDP system was explained to them. They were told what the new system was and what it would mean to them and their employees and agents at the branch office level. In addition, two senior EDP officials in the company spent several days at the company's offices in England explaining the new system to their employees there.

By 1960, once the Ordinary Life application had proved itself, there was no noticeable apprehension to be found amongst employees. However, the executive continued to keep all employees informed as to EDP developments within the company, and in particular kept posted those employees working in areas that had not yet felt the full effect of the new system.

As the insurance industry in Canada is not unionised, there was no formal negotiation or consultation with a trade union over the effects or implementation of the new EDP system.

IV. REDEPLOYMENT

1. *Transfers*

The estimates of the company in respect of clerical employees as at 1st July, 1963, are that about 20 men and 120 women have been displaced from their previous jobs. None of these has been laid off. Sixty-seven (7 males and 60 females) were transferred to new jobs and the remaining 73 (13 males and 60 females) were transferred to jobs unaffected by EDP. There remains only a small handful of people who have yet to face the prospects of displacement and transfer.

The general administration of this redeployment fell upon the Personnel Department of the company, which worked closely with the EDP officials in placing transferred employees in new positions. The head of the new Data Control departments was able to play a particularly important role because he had a rather extensive background in planning and personnel, and because his newly created departments would be taking the greatest number of transferees.

The company lived up to its guarantee that no one would be laid off as a result of EDP. This was made possible by the rather large labour turnover, and by the adoption of a corporate policy to eliminate or reduce new permanent recruitment wherever possible. Notwithstanding this and notwithstanding a vigorous effort by the company to transfer internally all displaced employees, there were three or four cases where fully productive work could not be found for the individuals in question, but they were nevertheless kept on in the employ of the company. All of these cases were with people of the chief clerk level who had 20 to 30 years' service with the company and who had built up their jobs out of proportion to their actual importance. Then when they were transferred to new work, they could not handle a position at an equivalent level and therefore had to take a job which usually paid about 60 per cent of their former salary.

Few, if any, difficulties were encountered among junior clerical personnel.

Generally, most transfers were of a lateral nature to positions of a similar type at an equivalent grade or level. Most of those employees displaced from the Ordinary Life Premium and Dividend sections were placed in the new

Ordinary Data Processing Department and were in charge of preparation of data for the EDP system and distribution of the system's output. With the exception of two individuals, everyone in the Addressograph Department who was displaced took up various routine clerical jobs throughout head office, both in departments affected and unaffected by EDP. The two exceptions here included one individual who became one of the company's best programmers and one who created his own job as a full-time serviceman for the company's many typewriters. The majority of displaced personnel from the company's Tabulating - EAM. Department were transferred into the new Computer Operating Department ; there were a few from this department, however, who did not have the aptitude to handle the new EDP equipment and were therefore transferred into various routine clerical jobs elsewhere. The other two departments from which several staff transfers had to be made as a result of EDP were the Ordinary Policyowners' Service Department and the New Business Department. Most of the individuals displaced went to various clerical positions throughout the company ; only a few of them were transferred into the data control area.

2. *Temporary recruitment*

To facilitate both the transfer of displaced employees to new jobs and the conversion to the new system, a system of engaging temporary employees was initiated. As from 1st January, 1959, only temporary employees were engaged to fill vacant positions created by the transfer of employees to new positions. All positions in the company were kept filled rather than increasing the work load already carried by the employees. Furthermore, extra part-time clerical help was brought in to help with the conversion. In 1957, 38 female part-time workers were hired for a total of 21,500 man-hours ; in 1961, 6 females and 4 males were hired for a total of 6,000 man-hours ; and in the first half of 1962, 3 females were hired for a total of 500 man-hours. All of this temporary help, both full-time and part-time, was used to handle routine clerical jobs only.

3. *Temporary promotion*

Another redeployment method used during the transitional period of changeover to EDP was that of temporary promotion. This was used mostly in those cases where department heads were transferred, temporarily or permanently, to key EDP positions to help with the conversion and/or the maintenance of the new system. The assistant department manager would then temporarily take over as the head of the department until that position was refilled by its old manager or until it was eliminated as a result of the EDP conversion. For the assistant manager concerned there would be no change in salary but he would get a bonus equal to the increase in salary he would otherwise have earned if he had been permanently transferred.

4. *Voluntary terminations*

Notwithstanding management's guarantees of job security, there were ten women employees who voluntarily left their jobs because of EDP. These were mainly older women who had been at the same job for many years and who could not face up to what it meant to change positions and to train for a new position.

5. *Selection of EDP personnel*

The company's policy was to recruit all of its EDP personnel from within the company, thus easing redeployment problems. Everyone in the company was informed that they might apply for the new EDP positions. In fact, between three and four hundred candidates were originally screened for programming positions. This screening process, from which only 20 candidates survived, consisted of a programmer aptitude test (drawn up by one of the computer manufacturers) and a general clerical aptitude test. If the candidate was graded at least a 'B' in each of the tests, he was given an oral interview by the head of the Systems and Programming Department.

Of the 20 candidates who got this far in the screening process, only 11 were finally selected. These 11 individuals were successful in passing the weekly tests administered throughout the five-week programming course. They also passed a further one-month on-the-job training programme where they worked on their own individual programming problem under close supervision. Once the candidate reached this level, he was appointed on a permanent basis. Of the successful candidates, 9 were men and 2 women. Nearly all of them were previously in accounting or actuarial work, with an average length of experience with the company ranging between five and six years. Only four of the original 11 are still programming with the company.

All of the Computer Operating staff were originally selected by open competition from employees within the company. Preference for the managerial, supervisory and console operating positions of this new department was given to people working in the Tabulating Department. The manager and two of the Computer Department's four supervisors came from the Tabulating Department ; the remaining two supervisors came from the Actuarial Department, although they both had had a year's experience with tabulating equipment. All four of the company's console operators also came from the company's Tabulating Department. The four original peripheral equipment operators were also selected on the basis of an open competition within the company. Only one of them, however, came from the Tabulating Department, while the other three came from various junior clerical jobs throughout the company. To date, the company has lost three of its original console operators and three of its original peripheral equipment operators to careers outside the company.

6. *Vocational adaptation*

As a rule the clerical employees who were transferred to new job assignments received no formal training to prepare them for these new positions. The exceptions were those employees transferred to technical EDP assignments such as programming and console operating. All other transferees were adapted to their new jobs by on-the-job training only.

Formal training of EDP programmers involved an intensive five-week course on machine language programming for the computer purchased by the company. A progress test was administered to the trainees at the end of each of the five weeks. The course was conducted at the company's head office by representatives of the computer manufacturer and by several of the men at the company who had become familiar with the EDP system. Furthermore, trainees had access to the company's computer throughout the course. After the formal course, the programmer trainee went through a one-month on-the-job training period when he worked on small production assignments under close supervision, at which time he was examined on his work habits, his attention to detail, his speed in perception and execution and so forth. At this point the trainee, if successful, was made a full programmer. However, it generally took another six months of on-the-job experience before he was considered fully competent to handle production assignments without any supervision.

The computer manufacturer was asked to conduct a console operating course for the console operating trainee, but all he provided was a slightly watered-down programming course which lasted for about three weeks. The real training, however, came on the job, as it did for the peripheral equipment operators. Estimates of the amount of training necessary before a console operator was considered competent to operate the hardware without difficulty ranged between three and six months. And as for the peripheral equipment operators, after a few days of familiarising themselves with their duties, they were ready to fill their positions competently.

In order to ensure co-operation and a smooth flow of communications between the EDP departments and key line departments, the heads of the various departments affected by EDP were given an introductory orientation course to electronic data processing, so they would at least have an appreciation of what the company was trying to do, even if they could not fully comprehend the new system.

Two members of the original Electronics Research Group who had taken programming courses were transferred back to their old departments to act as liaison men between these key departments and the EDP units. As a result, few communication problems were experienced between these particular departments and the EDP departments. However, the biggest problem continues to be that of communications, even though special EDP courses are put on occasionally to help overcome the difficulty. This problem has been more or less solved among Ordinary Life personnel, but the liaison problem with the other departments, whose work has yet to go onto the computer, has still to be solved.

The company believes that it made a mistake by not allowing all of the 14 key men, who were recruited to form the Research Committee in 1955, to keep up their connections with their old departments so that they might now facilitate communications. The company has been attempting to correct this by giving programming training to selected employees in departments whose work is scheduled to be converted to EDP, but the effectiveness of this programme has been limited so far.

7. *Salary and wage administration*

As explained above, the management of the company early in the conversion announced to all company employees that not only would jobs be guaranteed for everyone but that their present incomes would also be guaranteed. This policy was applied even in cases where an employee had to be transferred to a lower graded job with a lower salary ceiling.

The salary ranges of those starting into new EDP jobs were set by the company in the light of salaries paid in similar positions outside the company. Everyone entering into programming or console operating started at 80 per cent of the mid-point of these ranges. This level was to be increased for programmers, however, depending upon the programmer's educational background, so that a programmer with an MA would reach his mid-point immediately, while it would take someone with a general BA eighteen months.

V. EVALUATION OF ADJUSTMENT PROGRAMMES

There were no noticeable cases of stress and tension present throughout the conversion to the new EDP system, although a great deal of overtime work had to be put in. The annual hours of overtime put in by head office personnel rose from 10,000 in 1957 to 33,000 in 1959. In 1961 they had dropped to 29,000.

The other major change brought about in the working conditions of the company as a result of EDP has been the introduction of shift work among the computer operating staff. The computer is operated on a full-time basis, seven days of the week, so that four complete operating shifts are necessary. These shifts rotate regularly but nonetheless there is still a great deal of unrest about having to work at week-ends.

In addition to this, there is what one might call an underlying pressure present which permeates all the company's operations. This has resulted from orientation of most work systems towards the computer. The whole company is dependent upon the smooth functioning of the computer and all the major work operations of the company are now tightly scheduled to adapt to the computer's schedule. All EDP personnel are tentatively on call at any time in case the system breaks down. Furthermore, everyone will automatically stay on the job, without even being asked, until the daily work load has been processed. Most people at the company have learned to live with the new system and employee apprehension of the computer has disappeared. However, it is difficult to say what effect this underlying sense of urgency which now pervades the company is having upon employees.

Chapter III

FRANCE

INTRODUCTION

The French cases consist of two in the public and two in the private sector. But the fundamental principles of employee adjustment to technical change were not sharply contrasting in the two. The former included plants and enterprises of the Atomic Energy Agency and the Gas Industry and the latter Textiles (hosiery and knitwear) and the Bottling and Distribution of Liquefied Gas. In the first case, a new plant was built and manned. The gas company closed most of its older manufactured gas plants and substituted new technical processes and plants, first for the cracking of petroleum and then by the use of natural gas, which were located in new areas and cut the total employment of the company in half. The liquefied gas bottling corporation reported a total shrinkage of employment plus large-scale decentralisation of production units in which 25 centres and smaller service places replaced two large plants with a lesser total output. The manpower had to be relocated and retrained and provision made for the redundant persons whose employment was assured. Unlike the other cases, where single sweeping changes underlay the adjustments, in the textile enterprise there was a continuing flow of new equipment, management control methods including the use of a computer and new products. There was however a concurrent expansion in the volume of sales, and total employment more than tripled.

The studies were commissioned by the Ministry of Labour and made under the auspices of the Institut des Sciences Sociales du Travail by Mme. M. Durand under the supervision of the Deputy Director, M. Yves Delamotte. The investigator followed the " Guide for Case Analysis " provided by the OECD Social Affairs Division.

The planning techniques varied in each case. The atomic energy and bottling operations built their programme on relatively secure long-term plans for production and manpower recruitment and adjustment. In both the nationalised gas and the textile enterprises, however, short-term planning dominated the manpower and to a large extent the technical planning. In all but the atomic energy plant, constant adjustments had to be made to problems arising during the year.

The basic planning group of the gas enterprise included the production, distribution and training departments, with the latter truly carrying out the adjustment programme necessitated by the technical programme laid down by the other two departments. The group encountered many difficulties in proceeding to careful long-term programmes, since over the years they faced a changing pattern of new sources of raw materials, technical innovations and varying weather which often dictated the delays in the closing of plants. The result was that manpower adjustment programmes had finally to be reorganised to meet new time schedules. In the textile company, there were long-term programmes for product development and mechanisation, but not in the manpower field. The Production Department truly guided these innovations and was responsible for the allocation of staff. It worked out the manpower schedules at the end of each year in terms of its sales forecasts and technical, product, and organisational plans.

In the atomic energy case, there was complete integration of technical and organisational planning. Job definitions were carefully developed ; employee qualifications were set out and then the company proceeded to advertising for, interviewing, recruiting and training its personnel. Throughout there was close co-ordination between the time schedules for physical operations and manpower recruitment and training. The liquefied gas bottling operation reported a total shrinkage of employment plus large-scale decentralisation of production. On the basis of a ten-year development plan, the management could systematically plan the recruitment of employees from its staff. It set up a full complement in each new plant, even though current operations were below capacity utilisation. Temporary employees were brought in for peak periods to lessen the fears of permanent employees about their jobs. The manpower plans encouraged the relocation and retraining of the work force.

The most straightforward manpower programming was followed by the Atomic Energy Agency contractors. The procedures in the other cases were more complicated. They nevertheless all started with several common principles. They assured their staff against dismissals and all followed this rule closely, except for the textile company which had finally to resort to lay-offs for a small number of redundant workers. The principle of voluntary choice prevailed during transfer and training, which of course introduced more complications in planning and manning. The employees were not only assured their earnings and benefits but also their general status within the plant.

In the textile company, the company also liberalised its private pension plans to ease the adjustment and also allowed some employees to draw benefits at 50 years rather than the customary 60 years. Most of the new jobs required short periods of training so that the new techniques could be easily mastered and production standards reached. The effects of the absence of long-term planning could be felt in the redundancies produced in the hosiery department by a changeover from the manufacture of fully-fashioned to seamless hosiery. Some employees were transferred to a sister plant, and others retrained. The indicated provision was made for early retirement and finally about one-third of the employees in this department had to be laid off.

In the nationalised gas company the fundamental principles outlined above were followed, but basically its problems were considerably eased by the fact that the larger gas and electricity distribution organisation was expanding and absorbed many employees. The training department in charge of these transfers and training carried the burden of organising these adjustments. It had to work out the principles and procedures to conform to the collective bargaining agreement providing for several specific guarantees. Its plans also had to be flexible and responsive to the varying needs. The company had stopped recruiting new employees at the beginning of the changeover and also relied on the annual retirement rate of 3 to 4 per cent to reduce its number of adjustments. But normal wastage could not take care of all the redundant employees since productivity increased faster than sales, and the job structure changed considerably both as regards duties and geographical location. Among the special factors considered both during the time of the interviews with the personnel and in the formulation of the actual plan for individuals, were the need to offer jobs near the person's home, retrain irrespective of age, determine the specific job to which each employee was transferred at least three weeks before the end of training, and eliminate lost time between the completion of the retraining and the start on the new employment.

The bottling company followed the same careful process of adjustment, although it had a more difficult problem since its total volume of employment shrank from 500 to 350 employees in the ten year period. The qualifications and locations of the new jobs were markedly different from the old ones. Besides retraining, the problems of geographical transfer involved finding new housing, jobs for wives, schooling and other individual difficulties. Moreover, regional wage differences precluded transfer to five of the new centres. The difficulties in finding new places for all were alleviated by securing jobs for some employees in associated companies near the two old centres. But despite these efforts, about 100 workers were still left for adjustment at the time of the close of the study.

Training programmes were instituted in all four cases. The Atomic Energy Agency set up its own system of training from the start and employed careful selection procedures to minimise the risks of failure. The nationalised gas company used its regular facilities for training, but when there was a high concentration of needs in Paris in 1961, two special schools were established. Here also careful testing facilitated the decisions on staff assignments. The training was for six main groups of occupations and lasted six weeks, followed by job training. The liquefied gas company first used public training facilities and then found that it had to set up its own technical, clerical and sales training organisation. Training programmes were also arranged for those transferred to the associated plants and those who had not yet been found new employment. The latter received three months' general training to prepare them for specialised courses. The textile mills used community training institutions and supplemented this schooling with on-the-job training.

Besides following the basic principle of voluntary choice in the case of training and transfers and using interviews liberally to help the individual in his decisions, the organisations consulted with the staff committees and work councils. In no case, however, did joint consultation take place before the major changes were determined upon. The agreements with the trade unions in the nationalised gas and bottling companies helped define the terms of transfers and guarantees. The trade union in the nationalised gas company secured guarantees of payments for geographical relocation.

The cases reflect determined efforts to find adjustments for people affected by technical change within an organisation. Some resort was made to public training facilities but these were not always found adequate. There were some dismissals in the textile company and in the future there would possibly be some in the bottling plant. Otherwise, the problems were individual in character and were dealt with in interviews and in the development of personal schedules of adjustment. The companies with long-term plans for adjustment were better able to handle these problems.

Case I

CONCENTRATION IN A NATIONALISED INDUSTRY

I. INTRODUCTION

1. *The gas industry of France*

On nationalisation in 1946, the Corporation (Gaz de France) possessed 600 gasworks distilling gas from coal, spread over the whole of France and each employing an average of 20 people. The Corporation set to work at once on plant modernisation, since many of the works were already out of date, and forecasts of consumption were very promising. Indeed in its position as a near monopoly and public utility service, the Corporation could align its output curve exactly on that of consumption. It has expanded continuously, gas consumption rising annually by between three and four per cent.

2. *The stages in modernisation*

Technically speaking, two distinct phases in modernisation can be observed. The first, from 1946 to 1953, was one of small-scale changes. During this period, modernisation consisted of :

a) merging small, non-profitable works with larger works ;

b) closing down out-of-date works on organisational grounds as well as for obsolescence ;

c) installing coking plants in gasworks to remedy the coke shortage, especially of good quality coke.

The first phase already saw the beginning of a concentration process, but it was possible to absorb redundant staff since the industry was expanding and coking plants required large amounts of labour. The manufacturing processes, moreover, remained so far unchanged. The modest changes the industry had to make were, therefore, carried out without difficulty. The plant did not require much skilled labour. No retraining measures were called for in the first phase.

The second phase began in 1953 when the industry began to work with petroleum products, i.e. to install cracking plants. Much greater technical changes were now involved. Instead of solids, liquids were now being handled. Manufacturing processes were different, and the existing staff were, in general, ignorant of them. There was only one plant using a coke steaming process which was in any way similar to the processes employed in the new plants.

In setting up the new works, the industry had the assistance of the construction firm. This firm was responsible for stipulating the necessary skills and their relative gradings, training the first new staff and setting them to work.

In 1957, another factor in favour of concentration emerged — the gas deposits discovered at Lacq, distributed first throughout the South West, then extended to the whole of the Paris region, where consumption is high. A branch line towards Dijon supplies new areas in that region too.

3. *Planning the changeover*

Was it possible to make long-term forecasts for this kind of concentration ? How long in advance and how accurately was it possible to fix closure dates for the plants ?

Already in 1948 it was known in Gaz de France that many of the old works would have to go. The general line of development was laid down. The industry was going to concentrate its works and therefore reduce its labour force. The decision to stop recruiting dates from this time.

The actual rate of progress, however, depends on factors which can only be forecast with varying degrees of accuracy. In planning works closures the following factors, for example, must be borne in mind :

a) the depreciation of plant and its profitability. This can easily be forecast (plans are made to shut the least profitable works first) ;
b) geographical and seasonal increases in consumption to which the industry must adjust its output. There are priority zones in the planning of consumption. A more severe winter than expected is enough to upset the plan and delay a works closure by three to six months ;
c) most important, the concentration of works is taking place in the context of rising consumption, and works closures are planned on the assumption that it will be possible to merge smaller works into larger gas-producing units.

Prospecting the " sources " is central to a modernisation plan. It has two sides to it, each complementary to the other :

a) the search for new sources of supply, and estimates as to their possible expansion ;
b) studies to discover how to utilise the source in practice, each source requiring special study according to difficulties encountered.

Prospecting does not lend itself to concrete forecasts a long way ahead, because these are affected either by unforeseeable discoveries like that of gas at Lacq, or by uncertain negotiations such as for the purchase of gas from abroad.

In retrospect, it can be said that ten years ago the corporation could not foresee the discovery of Lacq gas and its growing exploitation. Even after its discovery no-one could foresee how long it would take to find a process for getting rid of the sulphur it contained so as to make it usable. Further, Lacq gas has a calorific power of 10,000 milli-therms per cubic metre, whereas that of coke oven gas is 4,500 milli-therms per cubic metre. Studies had to be made in each region to see if it paid the corporation better to use the gas in its pure state and modify its networks and apparatus, or crack the gas to make it utilisable in traditional installations.

Five years ago negotiations were begun with foreign suppliers. Provisional studies of profitability and installation modifications were then undertaken. But here too the element of uncertainty remained strong.

No operational decisions (either for construction or for administration) were taken before contracts were signed, the corporation wishing to leave itself freedom of choice right up to the end of the negotiations.

Five years ago decisions were still tentative, and not more precise than to the nearest two or three years, which ruled out any possibility of working out projects final enough to use as a base for reorganisation or adjustment in personnel structures.

4. *Effects of the changeover on manpower*

In spite of the continuous expansion of output, the combined effect of the changes was a considerable degree of concentration.

YEARS	COAL-DISTILLING PLANTS	GAS-COKING PLANTS	CRACKING PLANTS
1946	600		
1963	17	4	35

The above table enables one to calculate the number of works-closures of coal distilling plants recorded in the last 15 years. To it must be added 21 condemned coking-plants still working in January 1964. Their scheduled closure dates extend as far as 1968.

In addition, the transition from one manufacturing process to another involved a reduction in staff, and higher levels of skill. The old coke distillation plant required an average 11 specialised workers plus the handling staff; the cracking plant employs two maintenance workers.

The concentration of works combined with changes in the production process was bound to cause a spectacular reduction in numbers employed.

The Gas Production and Transport Department, which employed 12,000 people in 1946, was only 6,400 strong in January 1964.

II. INFORMATION AND CONSULTATION

1. *The works committee*

The main dissemination of information to personnel in the works is performed by the works committee, whose responsibilities are widely delegated to subcommittees which include :

- — a joint management staff advisory committee, called the " commission secondaire ", dealing more particularly with personnel rating and promotion ;
- — a " joint production committee ", which is an advisory, not a decision-making body, dealing with general questions whether technical or administrative. It is always kept informed of the prospects and difficulties confronting the undertaking. Each time there is a structural modification or the prospect of a general change, the " joint production committee " is notified in advance.

In redeployment matters, information goes through two main channels: the joint production committees as far as forecasts and general information are concerned, and the " commissions secondaires " for matters concerning particular employees or groups of employees.

2. *Meetings and interviews*

Over and above these normal channels, when a works is due to close the manager calls a general information meeting, which is attended by the receiving department, i.e. representatives from the Distribution Department. Once this meeting has been held, the persons concerned are invited to discuss their own future in personal interviews.

3. *Trade unions*

Trade union attitudes with regard to the changes are expressed :

a) by demands of a general nature : such and such a union is against the use of petroleum products in principle and pronounces in favour of using French coal ;

b) by demands concerning redeployment procedures. The unions have obtained from the corporation recognition of the voluntary principle in redeployment procedures. They asked that training and transfers should be voluntary. Redeployment when a works is being closed down is, practically speaking, obligatory, but the corporation does not impose any one type of transfer. The affected person can always refuse what is proposed for him ;

c) by demands concerning the social consequences of redeployment. For example, as a result of a union claim the corporation now pays each employee transferred the increase in transport costs due to the change in his place of work. Particular attention is given by the unions to " *career guarantees* ".

III. REDEPLOYMENT

1. *Responsibility*

Gaz de France carried out its redeployment within the vast organisation consisting of the twin corporations Gaz de France and Electricité de France. Although the two management boards remain distinct and independent of each other, many of their departments are jointly run, in particular the Training Department responsible for staff redeployment.

This department is normally in charge of the training and further training of employees of all categories and in all avenues of promotion, technical or administrative. It is also in charge of organisation and co-ordination drives, although the general responsibility for organisation rests with the hierarchy of each corporation.

The department is in central control of resources whose size will be realised when it is said that it is responsible for training the whole staff of EDF-GDF, or 120,000 persons in all.

The fact that Gaz de France was connected with another large organisation, itself undergoing redeployment, made it easier to organise training, and increase the opportunities for cross-postings.

2. *Keeping plans flexible*

The difficulty of forecasting technical-economic data very far in advance, especially with a sufficient degree of probability, explains the difficulty the department had in programming the redeployment. It had to deal with data and periods relating to the comparatively short-term, and, what is more, liable to change.

Thus, although managements forecast the timetable of gasworks closures, decisions to close could be put back one or even two years. In certain cases works managers were asked to step up production again temporarily. During one particular winter several obsolete plants were started up again. But it is not possible to start up a whole works again once it has been shut down. Works managers, conscious of the tentative nature of forecasts, were sceptical as to the likelihood of a closure on the date forecast, and slow to commit their staff to change-over procedures. " Works managers would have had to get rid of their best men, the youngest, as quickly as possible to get them fitted in somewhere else, but caution and an understandable desire to keep things together made them hold back a bit. "

The department therefore decided to work more or less by trial and error, and avoid hide-bound planning. Rules for transfers worked themselves out in the light of experience on the basis of one or two initial guiding principles. Redeployment procedures varied from case to case, so as to ensure the greatest degree of adaptability.

3. *Methods*

To absorb the manpower reduction without dismissals the Corporation used all the methods at its disposal :

1. there had been no recruiting for 15 years ;
2. retirements on pension amounted annually to between 3 and 4 per cent of the labour force (or 30 to 40 per cent in 10 years) ;
3. other jobs were planned in EDF-GDF departments where employees would find employment on the same terms as in the GDF Production Department. The principal receiving department turned out to be the Distribution Department serving the two corporations jointly. It offers a wide range of simple jobs, and technical advance is less rapid.

Every year the corporation forecasts to the nearest month the closure of works. This entails a comparatively rapid rate of change. " Works closures are brutal affairs. " Parallel with the works closure timetable, the timetable of training courses is worked out in agreement with the thermal power stations, since the courses are joint ones. Temporary recruitment makes it possible to keep production going in spite of the time required for training.

There is collaboration between the transferring and receiving parties, with the Training Department acting as a go-between. A tripartite committee was formed which met monthly and worked out arrangements for the next three months. In spite of this short-term procedure, the committee's arrangements were never more than 50 per cent realised.

As early as January 1961, all the preliminary data to hand indicated that the largest groups for redeployment were in the Paris region. It was desirable therefore to redeploy and train within the Paris region itself. Psychologically, to compel employees to leave their families and go into the provinces to EDF-GDF schools for training would prejudice the scheme from the start. The department decided accordingly to open two training centres in the Paris region, and these began their first courses on the 15th April, 1961.

It was now necessary to find out what the trainees wanted, since the training had to be on a voluntary basis. Contact with the employees was by interview. This was usually attended by representatives from the transferring management, the receiving management and the training department, as well as the employee himself who had the right to be accompanied by a union delegate.

These interviews helped people to make up their minds in the light of what could be offered and the particular circumstances of each individual case.

The transfer of staff was done by straightforward changeover to meter inspector, rate collector or domestic appliance maintenance posts (the employees taking their apprenticeship by doubling up with an existing distribution employee), or by changeover after preliminary training. By the end of 1963 an estimated 500 employees had been transferred to new jobs. after retraining. This was for the whole of the Gas Production and Transport Department.

4. *Principles of redeployment*

Some very important directives had been issued by the management. It was agreed :

a) that each employee would have at least the same standing (wage and seniority) in the new job as in the one he had left, and the same opportunities for promotion ;

b) that everything possible would be done to redeploy staff as near as possible to their homes. The placings offered by the Distribution Department covered the whole area. There was therefore some likelihood that this clause might be fulfilled ;

c) that redeployment would be attempted whatever the employee's age, except in cases where he could take advantage of the advanced retirement scheme.

5. *Rules of procedure*

It was soon obvious that the following rules of procedure were essential :

a) all aptitude tests, whether medical or psycho-technical, had to be completed before the redeployment course began if unexpected snags were to be avoided ;

b) once allocation to a training course was decided on and the interview was over, the receiving management was committed to taking on the employee from the day he finished his course. Management considered it psychologically very important that there should be no break in continuity between training and re-employment. It must be stressed that this could only be achieved because the receiving party, i.e. the Distribution Department, was a joint one for both EDF and GDF ;

c) the exact nature of the new job and its location must be decided, if not before the course, at least three weeks before its conclusion.

These rules tend to reduce the risks of the redeployment scheme and the insecurity of the staff in transfer.

6. *Training*

The management of the Distribution Department offered a wide range of occupations. After running the courses for some time, it was possible to sort out the various alternative trades and arrange the training to cover five or six main groups of occupations, from distribution worker and line maintenance staff to meter tester and rectifier.

Training programmes of about six weeks' duration were first worked out in draft form by schools specialists and training staff. The draft had then to be approved by the receiving department, since the programme had to be essentially demand-oriented.

The main object was to enable employees undergoing transfer to make an immediate contribution when they started on their new jobs. They had to be both knowledgeable and understand the tricks of the trade if they were not to feel at a disadvantage with their new workmates. This psychological aspect of re-adjustment was never lost sight of during the training.

Teaching methods put the emphasis on activity. " We tried not to overload the time-tables. In the syllabus, there was not much theory, but a lot of practical knowledge about the job and the actual manipulations involved. We avoided anything reminiscent of school, anything didactic, and kept to active or experimental ways of doing things. " To achieve such a programme, the training departments were chary of professional teachers, and preferred to train workers, foremen " who could show them how to do the job ". The new instructors for practical work were under the guidance of a go-ahead personality well-versed in psychological and technical matters who had been chosen from the Training Department schools.

7. *The cost of training*

This was easily calculable. Apart from the money sunk in the two centres opened in the Paris region, the Training Department calculates that to train a skilled worker from scratch costs F. 15,000. A redeployment course costs an average of F. 5,000 per person.

But the profitability of the scheme for the corporation did not have to be calculated. It was obvious. There were, after all, only two alternatives possible : either to leave employees in their old jobs, practically unemployed and unproductive, or to invest the sum required for their training for a few months, and recuperate it subsequently in profitable employment.

IV. CONCLUSIONS

This is indeed a case of empiricism in employment policy, when it is remembered that this enormous redeployment operation was not the result of reseach nor of long-term programming, that none of the social problems arising out of it figured in the technical programming of the changeover.

The redeployment of personnel was for a long time regarded as a selfcontained operation playing a secondary role to the technical changeover. It was delegated in its entirety to a training department.

This explains why, in spite of attempts at forecasting and short-term readjustment, the projects at this level were only 50 per cent realised. It also explains why the Training Department, having no reliable advance information on which to base its work, sought for and finally insisted on the guarantees necessary for the success of the scheme.

If there was any planning at all, it was in the working out of principles and psychological rules. The criterion here was not " what is reasonable ? " or " what is profitable ? " but " what best suits the men ? "

The department responsible for redeployment had no worries about training resources, nor about possible re-employment. At this level, the problem was above all psychological. The voluntary principle won by the unions obviously reinforced this diagnosis.

Occupational redeployment presupposes that everyone involved does his bit, and everything was done to make this possible. No trouble was spared to make certain that the transfers were made with complete security for the employees and with the maximum allowances for adjustment.

We can see that apart from the guarantees arising out of the collective agreements, like the principle of non-dismissals and the right to keep the same status, very stringent rules which were binding on the corporation were evolved empirically by the Department with the object of reducing uncertainty and any conceivable risk. Thus the commitment asked for from the " receiving units " to take on employees as soon as their training was finished shows the concern felt for making training a reliable asset, an investment whose result was never in doubt for the interested party.

Similarly, personal circumstances and ambitions in the various fields of occupation, family, housing, leisure, etc., could be sorted out during the personal interview so that a solution involving the least possible upheaval could be discovered.

The Training Department was convinced that the agreement and co-operation of the employees concerned could not be won at a lower price.

Case II

A POLICY OF CONTINUOUS CHANGE WITH A STABLE STAFF

I. INTRODUCTION

This firm, a limited company, is run as a family business by Mr. X and his nephews, who between them manage the various sales and administrative departments. It is one of the 15 largest textile businesses in France, and one of the foremost in its particular field, that of hosiery and knitwear, with an annual turnover of around 7,0 million francs.

The firm is expanding. In 1950, it employed 600 people ; in 1963, it had two factories at Y, employing 1,350, one factory at C with a staff of 500, and it has just bought all the shares of a firm in the same field with 250 employees, thus bringing the total to 2,100.

In addition to the factories, it runs a mechanical engineering workshop employing 150 people.

A sales network of 50 sole representatives covers the whole of France. At the Head Office there are about 40 people, working either in the General Management Department, or the Advertising Department.

The firm works in direct competition with other firms, both as regards sales and labour.

The sales of goods manufactured by the firm are subject to fluctuations caused by changes in fashion, and French and foreign competition has an influence on cost, on the use of new materials and new techniques, and on the creation of models.

As regards the labour situation, the firm's production is centred in town Y, which for generations (since 1850) has been traditionally involved in the hosiery and knitwear trade, and has a large population of skilled workers. Ten years ago, the firm was able to recruit skilled staff, but for several years now there has been a shortage of manpower caused by the expansion in the hosiery and knitwear trade, and by the other industries which have been set up in the town.

The firms in the town are going through a process of concentration brought about by the need for a constant increase in the rate of investment for modernisation : small firms disappeared first, and at the present time even medium-sized firms, employing between 200 and 250 people, are disappearing.

With this background of fierce competition, it is imperative for the firm to undergo continuous change, as much in technical and administrative areas as in production.

In this study we have tried to assimilate the experience gained by the firm of all types of change. One of the firm's conditions of survival is its ability to keep up an accelerated rate of change. It seemed to us that it would be more fruitful to observe the firm " on its own ground ", i.e. in the context of continuous change, rather than to concentrate on a specific technical change. Moreover, this gave us an opportunity to show how changes in general organisation were integrated into the normal life of a firm.

II. TECHNICAL CHANGES WITHIN THE FIRM

Technical change in the firm is directed towards expansion, the diversification of goods and adjustment to economic conditions. It brings about continued changes in production processes, equipment, and working methods.

1. *Changes in goods*

Before 1953, the firm manufactured exclusively articles of hosiery. In that year, after mechanisation had been introduced into production processes, one of the firm's activities disappeared — the repair of stockings. The corresponding workshop, with about 30 employees, became superfluous. The firm then tried to retrain the hosiery repair workers, so that they could start in a new branch, that of underwear. To begin with, staff were selected according to age, the oldest being transferred to other workshops. Some workers adapted quicker to underwear work than others, but the technical department considers that the success achieved was due to a large extent to the " co-operation of the workers, who were fully aware of the risk they were taking ".

In 1954, a new workshop was opened for the small-scale mass production of pullovers, the aim being to obtain competitive selling prices. This entailed techniques which were very different from normal making-up processes. However, from the staff angle, it was merely an addition to current production, and did not cause any great changes : the firm recruited experienced staff.

In 1963, it could be seen that production of these new goods had expanded to a point where it was overtaking that of the old goods. Hosiery now represents 20 per cent of the firm's turnover, underwear 25 per cent, and pullovers 50 per cent.

In 1964, after a neighbouring firm had been taken over, two new lines were begun.

Alongside the launching of these new lines, the firm had to follow market trends by developing current production.

An important typical case of change was the disappearance of the seamed stocking, whose sales graphs dropped almost vertically by 70 per cent between 1961 and 1962, in favour of seamless stockings. Production methods were different. A change was made from the " Reading " machine to small circular " Scott standard " machines, and, because of the qualifications required, it was not possible to consider the transfer of hosiery and knitwear operatives from one machine to the other. This led to a transfer of manpower from one factory to another within the trade, actually within town Y.

The firm had not expected this new line to have any future in France, and furthermore, since the firm was already firmly established on the market, current production and stocks of the old lines sold well for a long time. The result was that the firm did not immediately notice the drop in sales of its seamed stockings, and was a year or two late in starting retraining, compared with its competitors.

This delay gave the firm time to equip a machine shop with seamless stocking machines and to obtain the necessary staff, i.e. recruit new staff and train young people. However, this situation left little scope for the transfer and retraining of the hosiery and knitwear operatives.

The firm had a surplus of 74 hosiery and knitwear operatives who worked only on the old looms. First, all retraining possibilities inside the firm were exploited, and secondly, voluntary departures and recategorisation outside the firm were encouraged by making them financially advantageous. The age for the retirement fund was lowered from 60 to 50. In spite of all this, the firm had to dismiss some twenty of these operatives.

2. *Modernisation of production equipment*

Several dates stand out :

1948-50 : appearance of the " Reading " or " Cotton " loom, which required more highly-skilled operatives.

1958 : first large purchase of automated looms at the Brussels Exhibition.

But characteristic of the firm are the continual changes in techniques used for new products to increase productivity. A pointer here is that from 1955 to 1963 the firm did not change the selling price per unit of its main product. The increase in productivity has made up for the differences in cost due to increases in the price of raw materials and the wage increases during this period.

This increase in productivity is primarily attributed to the improvement of the technical side of mechanisation. The firm has a workshop which designs and constructs prototype machines for each type of product.

Alongside research into new machines or new production processes, work simplification studies and the corresponding teaching methods are undertaken.

The firm makes use of specialists. For example, a German expert redesigned a machine produced by the firm so as to increase its productivity. This research consisted of :

i) a motion study of equipment and materials used ;
ii) a study into methods for teaching operatives to apply the results of the motion study.

3. *Modernisation of management methods*

So as to adjust its production rate to demand fluctuations, the firm had to have at its disposal accurate information on sales, stocks and orders for each article. Planning at this stage means basically planning time, that is to say, in the short-term. In 1960, with this aim in view, the firm installed a computer to deal with sales statistics.

This brought about increased speed and efficiency in the sales department, made new tools available for estimating the success of a particular product and the quantities to be produced, and increased the firm's flexibility within its market.

In this branch of the consumer industry, trade forecasts determine the whole of the firm's activity. The acquisition of a computer symbolises the determination to put trade forecasts on a scientific basis. The firm programmes and controls its adjustment to market conditions with the accuracy required by this type of production. At the end of the production cycle, statistics of stocks and orders keep production accurately geared to demand.

The Sales Department is responsible for orders and their execution. The Production Department, whose approach is more empirical, is responsible for all the intervening stages :

i) planning for and constructing machines suitable for each product ;
ii) redeploying and training staff ;
iii) ensuring that production is kept within certain costs limits.

4. *Forecasts*

Within the firm, two different forecasting ranges may be distinguished :

a) development and modernisation forecasts connected with the general long-term expansion of the firm ;
b) short-term operating forecasts from the sales curve for each particular product.

Expansion forecasts comprise forecasts of purchases of land or property, or of investment in heavy equipment ordered from other firms. So, when buying a loom, the firm is dependent on the delivery times imposed by the manufacturers; it takes a year to get a loom. In the same way, electronic management aids have to be ordered at least 3 years in advance.

Business forecasts are essentially short-term sales forecasts. They are made for one year. For example, in December 1963, the sales department forecast 1964 sales for each type of product, after which the production department worked out the effect on equipment, staff and their distribution. Similarly, forecasts are made just for a year for all the workshops ; in the case of the disappearance of fully-fashioned stockings, steps were taken to reclassify the staff, where necessary, roughly a year in advance.

When a new product is put on the market, the following forecasts are made :

a) sales forecasts, in consultation with representatives ;
b) investment forecasts, in consultation with the technical department, which decides upon the machines required, and plans workshop layout, staff and job classification.

The production programmes for each workshop are decided upon once a month. Stock and order statistics determine the priority which the workshops will give to the order.

III. STAFF POLICY

1. *Employment policy*

It is the firm's policy at present not to take on staff from outside ; " whenever a job falls vacant, it is filled from inside the factory".

" We have a large permanent staff, very many of whom have been with the firm for a long time ; it is not unusual to find people who have been with us for 15 or 20 and even 30 years. This makes for certain restrictions : it is difficult to put people from outside in positions of authority over the older employees."

" The same thing happens when a new product is brought out ; at first everybody accepts it, and takes on more work ; in principle, no new staff are taken on."

Precautions are taken so that no workshop is allowed to amass a surplus of unskilled labour which the firm will not necessarily require in the long-term : for example, for one particular range of goods, the production of rib borders for pullovers required an operation to be carried out on each border. In view of the expansion of sales, the very short-term forecast was that this workshop would require a staff of 60. This unskilled, monotonous work was done by old people, and if the staff of this workshop had been allowed to expand, serious re-employment difficulties would have been encountered when this particular range was stopped. The technical department therefore developed a machine which would handle 700 rib borders simultaneously. Only three operatives are now required in this section.

Changes in production are rapid and require continual and immediate mechanisation of production processes. Mechanisation means fewer changes in staff strength and avoids problems arising from continual staff transfers and periodic hiring of new staff.

It can be seen that employment policy, though it is empirical and cannot be forecast in the long-term, is a policy of prudence and economy, based on trying to prevent problems of staff strength and staff transfers.

2. *Qualifications and training*

Automation has not brought about an increase in qualifications required of employees.

It is estimated by the Personnel Department that, under conditions of expansion, a 20 per cent increase in the number of workers would be accompanied by a 10 per cent increase in the number of technicians.

The vast majority of the workers employed by the firm are specialised workers for whom experience is more necessary than actual qualifications, which explains why the changes have not, on the whole, brought with them difficult training problems.

Training of specialised workers is short ; it takes the form of a 6 to 14 week training course. Afterwards, the firm considers that one year's working experience is required for " normal " productivity to be reached.

For training, the firm uses what was originally an employers training centre, the " Hosiery and Knitwear Centre ", an accelerated apprentice centre for female operatives. Trainees are paid by the Ministry of Labour. In addition there is the Productivity Centre, where courses are given for technicians and supervisors on time keeping, method organisation, teaching methods and an introduction to scientific management. Training is carried out partly at the school and partly in the factory.

3. *Staff information and staff attitudes*

The Board meets every month, at which time staff representatives are informed of new projects as and when decisions are made. They are also informed of sales curves and are made aware of slack periods or backlogs in the various workshops, and of the future of all the products.

Product changes are in general welcomed by the staff : " the work is very repetitive, and it breaks the monotony ". Then again, when one particular branch of production stops, the employees know the risks involved and, apart from age considerations, the firm generally obtains their co-operation when trying to integrate them into a new work field.

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The staff is well aware that these changes are a necessary economic part of the firm's life. They know that similar firms are disappearing and that in the long run their security of employment depends upon the firm being dynamic. It is lack of change which would be disturbing.

The firm is consequently in a state of continuous change, while keeping a permanent staff. Within the firm itself, staff are not inter-changeable, not particularly because jobs are specialised, but for psychological reasons : female employees refuse to change workshops or even cloakrooms, since they feel at home where they are. They do not easily settle in under a new supervisor. Since the workshop is a psychological unit, each type of product has to be allocated within the workshop.

4. *Technical changes and remuneration*

From the very start of this industry, piece work has been the traditional method of payment since it seemed most suited to the extreme division of labour and to the repetitive nature of the jobs. Moreover, it appeared to be a fair method, as each is paid according to his work.

This naturally only concerns staff working on an hourly basis, since mechanics and fitters, being highly skilled, are on a monthly basis.

In 1953-1954, the firm was the first in its field to adopt a two-part wage system, with a relatively large proportion as fixed wages, representing about two-thirds of the wage, and only one-third remaining as piece work.

This wage system appeared to have certain advantages for the staff, particularly in the circumstances in which it was adopted — in a new workshop using a new material which had only just been brought out. This made for a reduction in technical risks and avoided fluctuations in wages.

But after being the first with the " two-part wage system ", the firm came back to piece work following the technical changes of 1958-1959.

The major drawback of the two-part wage system was that it did not give enough incentive to the most expert workers, and it encouraged them to move to other firms. The output of one operative could in fact be as much as twice that of another.

However, according to the Personnel Department, the piece-work system is not satisfactory : " each time a method is changed, the operative starts by losing money, but in the end she benefits after a period of recoupment during which we guarantee her wages (and we guarantee this as long as progress can be made in adapting to the new work) ". After progress has been made in mechanisation or method study, operatives manage to produce 25 to 30 per cent more without any extra effort. This leads to wage disputes which to some extent act as a brake on technical progress.

The firm has to recover part of its investment in machines or design by higher productivity. But the individual operative has no hand in this improvement in her output, and selection of operatives for working the new machines is likely to be questioned by the other operatives who remain at their old output. Consequently the firm lowers the piece-work rates for the new machines, thereby causing discontent among the workers.

The present shortage of labour in this field makes this problem of wage settlement even more acute. Other firms in town Y follow a much freer and more fluctuating employment policy : in certain circumstances, they take on people at any price, only to dismiss them again a few months later if this proves to be necessary.

IV. SUMMING UP

On the production side, the firm's manpower policy is one of quick adaptation to changing needs. This is possible only because the Production Department is to a certain extent self-sufficient as regards the means of production. Using data and orders from the Sales Department, the Production Department provides for and decides upon the means of production, and constructs them as and when required, thus allowing a production rate to be followed without dependence on outside agents. Consequently it organises, selects and trains staff, and it co-ordinates and controls all the factors of production.

The indivisibility of jobs which there is at this level is based on the knowledge that the Production Department has of its staff and of the techniques used. Production changes are carried out with a permanent stable staff used to repetitive tasks.

This empirical method used by the firm when adapting to changes proves particularly effective in the case of short-term changes. More sweeping changes require more detailed and longer-term programming. Retrained hosiery and knitwear operatives, for example, could not be re-absorbed by the normal machinery of the firm, which had to resort to special measures.

Case III

DISTRIBUTION OF LIQUEFIED GAS — A TEN-YEAR PROGRAMME OF DECENTRALISATION AND MECHANISATION

1. Introduction

The activities of this company which distributes liquefied gas consist basically of filling the gas bottles and of distribution operations.

The company belongs to an international industrial group, which enables it to make use of the group services for forecasting purposes — an operational research department and a computer pool. This gives the company a wider field in which to transfer its staff, and sometimes the group's own facilities for staff training may be used.

In 1958, the firm had two factories in France, R and C, each employing about 300 people. It also had a network of distributors spread over the country.

Gas bottles were transported by road and rail, which involved a considerable amount of handling since they had to be unloaded and reloaded at each stage of their journey. The firm owned transport equipment.

By 1958, the works had reached saturation point : the output of each of them had reached a ceiling of 42,000 bottles per year. This output could not be increased without further investment. In addition, market research forecast an increase in consumption of some ten per cent based on 1959 sales.

To be able to meet, both technically and commercially, the estimated consumption requirements in the following ten years required a new approach.

In these circumstances, the changes had to :

- produce new filling capacity in two years ;
- get faster rotation of equipment ;
- decrease transport costs.

Technically, the following solutions were possible :

a) to keep the existing structures but to carry out local investment ;
b) to break up existing structures into a larger number of small, widely-dispersed centres, i.e. to decentralise bottle-refilling and also sales points.

A profitability study favoured decentralisation and called for modernisation of filling and transport techniques. Factory mechanisation thus coincided with a decentralisation policy : the two were implemented at the same time.

II. TECHNICAL AND ORGANISATIONAL CHANGES

1. *Decentralisation*

A further profitability study determined the number and the optimum size of the filling centres.

The production figure of 20,000 tons per centre was arrived at, which, when correlated with long-term requirements, immediately determined the number of centres, namely twenty-five, which were to be constructed in 10 years.

The number of centres to be constructed each year, their date of opening and their siting was then determined by taking into account the increase in consumption by areas. A schedule of opening was drawn up in relation to long-term requirements.

This again necessitated some basic decisions :

a) priority was given to the Northern Zone where factory C was already working at full capacity, whereas R, situated in the South, still had reserve production capacity ;

b) a comparative study of transport costs by road and rail determined the actual position of the centres. A return journey which took one day by road, took four days by rail. On the other hand, distribution by rail was more attractive for distances of over 100 kms, for instance for bulk supply between centres. Consequently, centres had to be sited both on a 20-ton capacity railway and at a focal point of the road system ;

c) finally, the question arose of the order in which the centres should be opened. For each filling centre, the recovery time and marginal profitability were calculated : the most profitable were opened first.

2. *Factory mechanisation and modernisation of transport*

The aim of mechanisation was to avoid having to transfer bottles from one point to another inside the factory and having to change the lorry equipment. Under the new system bottles are unloaded, come into the filling line, come out again and are reloaded automatically on to lorries without being handled at any point.

This modernisation scheme was programmed by the company's design department, which designed the mechanical equipment involved. Works and centres were both mechanised.

The design department also made detailed long-term plans of the jobs to be filled in each centre or factory for each degree of mechanisation and level of production. Consequently, the total staff strength by trade categories was known.

III. MANPOWER POLICY

1. *Size of the problem*

The combined operation of mechanisation and decentralisation was to result in a considerable decrease in staff requirements. Productivity is now four times higher than it was. Centre B for example, fills 9,000 bottles per year with a staff of 15, whereas Works C used to employ 300 people for 42,000 bottles per year. Originally, the Company employed 600 people.

Under the new structure the bulk of the work will be done in 25 centres each employing an average of 15 people, though there are some works departments outside the centres.

Since, as a matter of principle, the company does not dismiss staff, decentralisation and mechanisation inevitably raised certain staff problems. The firm reacted to these both by using long-term forecasting in its employment policy and by starting the progressive retraining of factory staff.

2. *Employment forecasts*

The new centres are of a modern design. Right from the outset, the staff strength and jobs were fixed as though there were already complete automation : " When the machines arrive, we shall be ready for them and everything will be organised. " The same thing applies to production : the centres were opened for a capacity of about 10,000 tons per year, but were designed for 20,000 tons with no change in staff numbers.

If a centre is planned to produce, after a period of operation, say 1,000 bottles per hour, with a high degree of mechanisation, then staff numbers are fixed with this in view. In this way the numbers of staff required for all types of centres can be calculated, whether expansion is fast or slow. In addition, casual labour (signed on for several months by agreement with the worker) may be used to satisfy short-term labour requirements. The firm habitually uses labour of this sort for certain seasonal activities.

As regards qualifications, the basic requirements for each centre are :

- — a qualified engineer ;
- — a pump operator ;
- — a maintenance mechanic ;
- — a supervisor ;

and an average total staff of about 15 people. This staff structure is stable in spite of the ever-increasing mechanisation and the expansion of production demanded by the sales curves.

Even so, a problem cropped up when the new structure was formed. Before decentralisation took place, the firm had two types of supervisory staff :

a) technical staff, controlling bottle filling in the works ;
b) commercial agents organised as a network divided into seven zones, who dealt with distribution.

Geographical decentralisation was accompanied by a regrouping of the filling and distribution operations at centre level. Centres became assembly points for agents and technical staff, with a system of dual management.

The policy for estimating employment requirements was treated in the same way as economic forecasting, that is to say over ten years.

3. *The retraining plan*

The retraining plan rests on certain premises : all the factory labour forces are involved in this operation in one way or another, either immediately or in the long-term, whether its effect is a transfer, promotion or retraining. The plan is spread over 10 years, using the opening dates of the new centres as the basic schedule.

Some complications have arisen from the wage rate and the method of payment. After a year of service in the firm, all salaries are paid monthly, as provided for in the trade union agreements. Employees are paid higher than the prevailing rates for the skills they have, and in addition seniority brings with it big advantages. It was hard to leave people to find jobs elsewhere at 50 per cent of what they were earning here. The possible outlets were therefore narrowed down into two main channels : either to train staff who would remain or could be transferred to the filling centres under construction, or to find them employment with business associates where they would have the same advantages.

IV. TRANSFERS TO OTHER COMPANIES

In 1959, in the area of the factory at R, it became apparent that there were situations vacant in two associated companies, which required skilled assistant operatives.

The DLG started running training courses for assistant operatives. Volunteers were called for. Three courses took place in one year, each course lasting three months. Teachers, lent by the companies taking the staff, ran courses in chemistry, physics, mathematics and French.

Forty-five workers were transferred, three without any change in status. They had the same advantages as at the DLG and had benefited from the training they had received : ordinary workers became skilled workers.

This experiment was not repeated. It underlined the fact that success is not obtained merely by volunteering. Certain volunteers were not of the Certificat d'Etude standard, and 15 had to be dropped as the course progressed. The 45 who were transferred continued training on the spot after the course.

V. TRANSFERS AND RETRAINING WITHIN THE COMPANY

1. *The system of transfers*

The transfer system operates in the following way : the firm announces its plans and offers training facilities, but waits for candidates to come forward. The candidates know that if they take advantage of the training they will be transferred, and they also know that, if they are, the firm will find new housing for them and will guarantee them a wage at least equal to and generally higher than their original wage. Candidates are considered in the light of tests. Those with a satisfactory performance in the tests give their agreement to receiving training and to the transfer which the firm will offer them.

More specific requests for transfers, coming directly from the staff, are in most cases granted.

For the opening of the first centre in 1959, the firm employed unskilled workers. When decentralisation came, the firm tried to use redundant labour from the factories. Transfers were made in technical, administrative and commercial sections.

2. *Technical training*

Each centre required skilled workers in small numbers : a supervisor, a mechanic and a pump operator. At first the firm used the accelerated training centres in Marseilles and Rouen. For his training, the worker was seconded for a period of six months, during which he did full-time study with normal wages. The training centres selected participants by examination and in limited numbers, with the result that in three years the firm was only able to train 14 mechanics, which did not cover requirements.

This led the firm to open its own training centre, to construct a dummy production line, and to provide technical training for all the staff. Mechanics were selected from among the best workers, while the remainder improved their knowledge of machines. The idea behind this was to make machine operatives into specialists, so that they could carry out small maintenance jobs themselves : this fosters the feeling that the machine is under their control, and they take more interest in their work. Moreover, daily maintenance of the machines showed up potential breakdowns before they happened, thus tending to make the role of the worker in front of an automatic machine less passive. Machine operatives were moved around within centres without receiving any great promotion : from being ordinary workers, they became specialised workers. Transfers were voluntary after information had been put out by the firm.

3. *Training of office workers*

The centres required assistant accountants, and there were workers available, so the experiment of turning them into assistant accountants was tried.

But here, caution was the order of the day. An outside organisation had given psychological vocational tests to practically all the factory staff, and a record card existed for each person showing an outline of his knowledge and a digest of his potentialities. On this basis, 15 workers were selected for an administrative school which the firm set up specially. They received full-time instruction for two months in general subjects, with specialisation in stores control and accounting. These employees have all had their appointments confirmed.

Later, it became apparent that in the filling centres administrative staff were required who were " jacks-of-all-trades ", able to deal with book-keeping, store-keeping, cashier's work and dispatching. Thus a second stage of the administrative school was opened which gave three months' general and accountancy training to the best of those employees who had been working in the firm for one year. They will soon be taking up their posts.

This forced the firm to provide replacements by means of a new wave of workers trained in stock accounting, thus setting up a system of sequence promotion.

4. *Training of salesmen*

In the commercial field, the firm also selected workers by means of tests, with a view to training them to be " network salesmen ". They followed two-month courses. Although after training they were admittedly not always able to draw up a highly detailed report, these salesmen were of great commercial value in the field.

Only a few people were trained in this way, but a considerable amount of promotion was involved.

5. *General training of other redundant employees*

After four years of changes, there still remain about a hundred workers from centre C to be retrained. All are paid by the month and have no specific skills. They cannot be retrained immediately : a training centre has been opened for them where they will have :

a) three months of general training : an ex-school teacher will give them the basic lessons, in addition to which they will take courses in technology in the factory ;

b) preparation for special courses at the school at Rouen. However, it is felt that only a small proportion will be able to take these.

The firm also considers requests for training with a view to the candidate being re-employed outside the group. Several such cases have arisen.

6. *Payment during training*

Staff are always seconded for full-time training, during which they are paid and may receive a travel allowance.

VI. INFORMATION

Information is given through the works committee, and also directly to individuals (transfers are suggested to those who obtain the best results in tests). According to the Social Relations Department : " Staff must be given information at a very early stage, since it is difficult to get ideas accepted."

Information is also transmitted informally : " a sort of bush telegraph operates ; for instance when the centre was opened in Brittany, the Bretons working in Normandy knew immediately."

Information can even take the form of a pressure on the staff : " information must be repeated to them the whole time : you know that this will not go on forever, that staff numbers will be reduced ; face up to your responsibilities, if one day we had to dismiss staff.... "

The firm had some doubts about giving information to the staff. The purpose of giving information is to make the staff aware of the situation and to encourage them to make up their own minds about being transferred. But this information tends to put the staff in a *position of insecurity*. Self-defence mechanisms work in various ways. Some people make decisions ; other fall back on luck, their seniority, or their confidence that the firm could " never do it to them ", and anyway that dismissal is not possible.

The firm is well aware of this ambiguity inherent in making information public. The Social Relations Department considers that : " people must be informed... very early on because it takes a long time to convince them. But there are limits, and we cannot ask our staff to live in a state of complete insecurity for four years."

In effect, information plays on insecurity, on the risks inherent in a wait-and-see attitude, and this is not always compensated for by prospects of future security or promotion which could be a positive motivating factor. The firm cannot guive guarantees or make promises when it is uncertain of its own position and of the potential of each individual.

Psychological testing of all the staff has made it possible for the firm to make more promises with less chance of being wrong, i.e. forcing decision-making by positive motivation and not merely by the threat of ever increasing insecurity.

VII. PROBLEMS

1. *Regional differences in wages*

Certain centres cannot take staff transferred from other centres. When the difference in wages between regions is too large, it is unacceptable for the firm to transfer the person concerned, since it would involve a decrease in salary. On the other hand, to transfer him at a salary equal to his original salary would bring in the problem of aligning all the other wages in the new centre, perhaps even in the region. At company level, the problem is thus insoluble. About 5 centres out of 25 fall into this category, and where they are concerned, the firm is obliged to recruit staff locally and to refuse requests for transfers. This has sometimes involved a whole group of people in the firm. For example, when some workers, who came originally from Brittany and who were working in Normandy, found out that the firm was opening a centre in Brittany, they all applied for transfers and their requests could not be met.

This brings out a well-known problem connected with the history of population migration in France, and the problems of decentralisation. It is possible to leave certain non-industrialised zones ; it is impossible to enter them.

2. *Attitudes to transfer*

It seems that the firm has come up against refusals to transfer. It therefore finds itself obliged to insist that those taking training give their previous agreement to being transferred.

There are many reasons for refusals. Some employees do not wish to leave their houses, their villas, their gardens, their flowers ; some, whose wives are at work, are uncertain of finding her a job elsewhere. Each case is different. Refusals are sometimes for " sentimental reasons " where conditions of promotion and housing would be better, but where the person prefers to remain an unskilled worker rather than be transferred.

3. *Attitudes to mechanisation*

The Design Department notices some hostility to mechanisation which it explains partly by the fear of dismissals and also by a certain resistance to change. New staff settle down much better than old.

However, ten years ago such changes met with genuine opposition. The first lifting trolleys were very badly received. Now workers are more prepared to accept them.

4. *Housing*

One of the difficulties encountered by the firm is that of rehousing its workers, which is inevitably made more difficult by their family responsibilities.

Case IV

STAFFING A NEW FACTORY IN A NEW INDUSTRY

I. INTRODUCTION

In July 1961, with a view to setting up the Pierrelatte factory, the Atomic Energy Commission instructed Company X to install the equipment and carry out the leak-tightness inspection in the new plant.

As a sub-contractor, Company X found itself faced with a double problem :

a) working out and putting into effect an organisational plan, covering both the physical organisation of the factory and the jobs to be filled ;

b) recruiting, training and setting up a staff capable of fitting into this completely new industry.

We centred our study on the second of these.

The operation was made difficult by the fact that Pierrelatte was a pilot factory in a new industry. Vacuum work is highly specialised, and in this case, a very specific type of leak-tightness was being dealt with. In fact, the methods in the Pierrelatte closed system will show up a loss of one cubic centimetre of gas in 3,000 years. The installation thus required a large qualified staff, of a sort that was practically non-existent at the time. In any case, the qualifications themselves were not clearly defined, since this field consisted of only a few specialists. To the best of the Company's knowledge, no school in Europe offered training to technicians in vacuum work.

In an effort to solve this problem, the sub-contracting Company made use of the central services of the industrial electronics group to which it belonged. The selection and training department of the group, with the assistance in technical matters of the Company and the customer, took over the job of organising this new kind of retraining.

Since the Pierrelatte factory took a considerable time to build, forecasting and programming could be carried out in favourable circumstances. With the request made in July 1961, the Company fixed on 1st January, 1962, as the opening date of the Training Centre.

The departments concerned thus had six months to plan the jobs, define qualifications, arrange training programmes, provide the school equipment, carry out selection, and provide participants with accommodation, etc.

It should be pointed out that this programme took place under most unusual conditions, conditions which were favourable to long-term forecasting and the application of scientific principles, without organisational obstacles. A functional department of the firm became an autonomous unit and was free to apply advanced methods of work analysis, of staff selection, and even of job advertising.

In an ordinary case, changed techniques inside a firm are integrated into existing structures. Creation of new qualifications, as in the present case, then raises not only technical problems but also problems of power relations and organisation and adjustment to pre-existing structures.

II. ESTIMATING MANPOWER REQUIREMENTS

Forecasting consisted firstly of laying down the necessary qualifications, and secondly of predicting the standard of recruit who would be obtained, so that the amount of training required, and thus the duration of training, could be determined.

1. *Forecasting qualifications and job structure in the new field*

Staff regulations had to be laid down which would cover a wide range of different jobs. This could only be done by group work, which was carried out by permanent liaison between the Group's Department of Industrial Psychology, the sub-contractors who already had some experience of vacuum techniques, and the representatives of the Atomic Energy Centre.

Job descriptions then had to be compiled, based on the plant's technical structure, and a precise survey of jobs made, in order to determine the various psychological, sensory and intellectual aptitudes required, and the knowledge necessary for the different grades.

The job survey resulted in a theoretical grading system comprising four levels :

1. detail inspector ;
2. inspector (staff grade) ;
3. leak-tightness inspector ;
4. principal leak-tightness inspector (technician).

However, so as to avoid imposing a pre-determined structure in the new field, training had to make allowance for staff developments.

It was therefore decided that, to begin with, training should be given at two of these levels : the lowest, that of detail inspector, and the highest, that of principal leak-tightness inspector. The former had before them a well-defined career leading to staff-grade inspector, then to leak-tightness inspector, and finally to principal inspector, according to the knowledge and experience they would acquire. Principal inspectors could progress in the direction of a post as head of an inspection department, i.e. acting management and later management.

This freedom to develop was considered to be essential : " in this type of industry, where technical development can be very fast, it would have been a mistake to lay down strictly defined professional qualifications. The individual's knowledge must be able to keep pace with technical development."

2. *Prognostics of recruiting*

Recruiting was to take place within a radius of 100 kilometres around the site of the factory.

A priori, the qualifications sought were not to be found on the labour market. The problem was to know what resources were available.

The Ministry of Labour's regional department of industrial psychology and the Departmental Manpower Directorates supplied the basic information. A survey was then conducted in an attempt to assess the standard of technical knowledge of that section of the population who could be expected to answer advertisements put out by the firm.

At this point it was possible to state further criteria such as the selection standard and the level and duration of training. The industrial psychology services compiled a selection test based on the job analysis, and selection was to be carried out with a particular aim in view : people were required who were quickly adaptable to different circumstances. The selection criterion was not merely diplomas held. These qualifications were not an end in themselves, and in fact more weight was given in certain cases to intelligence test results than to actual knowledge.

III. MEETING MANPOWER REQUIREMENTS

1. *Preparing the ground*

Recruiting, which was spread over several months, began with a campaign in the press through the whole of the Rhone Valley region as far as the Mediterranean Coast, a pretty large area in which to reach possible candidates.

Following an enquiry among local newspapers, a popularised introduction to the Pierrelatte factory and to vacuum techniques was published in the form of news items, each covering roughly half a newspaper page. Then a series of advertisements was published based on well-tried advertising techniques. At a pre-determined rate, the advertisements gave fuller and fuller details, and " situations vacant " notices appeared again a few pages away. Lastly, the dates and places of application were fixed.

2. *Selection*

All the candidates were requested to appear simultaneously (on the same day at the same time) in five large towns in the region, in premises lent by the Ministry of Labour. The press was the medium used for attracting candidates because the industrial psychology department considered, from its experience in the Paris region, that a prior exchange of correspondence between the firm and the candidate would reduce the number of candidates by two-thirds.

Two hundred candidates turned up on the morning of the examinations, and after a preliminary sorting process, 150 candidates finally passed the examination which consisted of an intelligence test, a test of spatial perception and concentration, and an exercise in mathematics and physics.

At the end of the first stage, when 40 people had been selected, a vocational psychologist visited the 40 candidates to select the 15 who would form the first batch of employees required. The aim of these interviews was to get to know the candidates, to allow them to express their opinions, and to take into account their family situations, the time required for them to leave their present employer, and other personal data. The first meetings were intended to select principal inspectors, who were initially given jobs as operatives, so that they would have the first-hand knowledge required for introducing detail inspectors to their work when they had finished the training course.

3. *Training*

As soon as selection was over, the Training Centre, set up in a village near Pierrelatte, was taken over by a design engineer attached to the Company. This design engineer had taken a three-month teachers' training course, and had drawn up his training programme in collaboration with the department of industrial psychology.

After some changes had been made, the following study programme was decided upon for principal inspectors. (The percentages are the actual figures : they were worked out after training) :

a) a mathematics programme of the elementary mathematics standard with certain concepts used in higher mathematics (12 per cent of the training time) ;
b) training in electricity and electronics (13 per cent) ;
c) courses in electrical and mechanical drawing (8 per cent) ;
d) courses in vacuum techniques (7 per cent) ;
e) practical work (47 per cent) during which pupils were able to operate all the equipment which they would later use in the workshop ;
f) training in human engineering (13 per cent), i.e. teaching of ideas intended to facilitate the integration of these young people into an industrial environment : e.g. fundamentals of scientific management, worker psychology, labour relations, staff relations and personnel management, discipline, reprimands, social legislation, and also methods of expression, report writing.

For skilled operatives (detail inspectors) the amount of mathematics, physics, and electricity was reduced, but the proportion of the time spent in using the equipment was approximately the same as for the technicians (principal inspectors).

The duration of training had been fixed beforehand (and this later proved quite satisfactory) : four months for technicians, and two months for skilled operatives. Courses took place in successive series between January 1961 and July 1961, during which time the Centre trained some 150 people.

The examination scripts were submitted to a board, which decided upon each candidate's technical ability and thus on the qualifications to be awarded. Thus, after the examination, an embryo structure had already been established : after first grade training, for example, operatives came out at least at detail inspector level, but in view of the standard of the people passing the examination, it was decided that those with a " very good " pass should be appointed to the next level of staff grade inspector. The number in each grade was later increased by output from intensive courses.

Meantime, the Centre's training scheme had been approved by the Ministry of Labour. It thus became possible to award a diploma.

IV. CONCLUSIONS

The industrial psychology department concluded that " we have in effect carried out retraining ; that is to say that we have taken people from widely differing backgrounds, take for example bank employees who, though holding the full technical Baccalaureat were earning F. 400 a month, or young people with the CAP and the BEI who were working as washing-powder salesmen. We give them further specialised training which has shown extraordinary results for them : from the wages point of view, a bank employee's earnings rose from F. 400 to F. 1,200, with a relatively small financial contribution on his part, but through intensive work and motivation."

" The success of the operation springs from the time which was available for preparation between making the decision and opening the factory. Normally affairs of this type are of an improvised nature. In this case, we had time to study the structure of the trade, to plan the training, and to prepare the ground. "

This is an example of extremely detailed programming put thoroughly into effect.

In this case too, where a complete innovation was made, the process was freed from the internal constraints of an existing organisation, and the training and setting up of staff was production-motivated. With such a background it was possible to implement newer, more logical and more effective measures.

Chapter IV

FEDERAL REPUBLIC OF GERMANY

INTRODUCTION

The four German cases include one governmental department (Pension Administration) and three private firms in the metal processing, steel rolling mill and paper-making industries. Computers replaced manual operations in the first case, thereby intimately affecting the departments which determined entitlements and calculated and made net payments. In the three other cases, new equipment and processes replaced older machines. The motive for the changes in the public department was to reduce labour demands in face of increased work loads and to cut down on delays in the processing of claims and payments; in the private plants it was to meet increasingly severe competition and also concurrently to expand output.

The new metal processing plant was established 40 kilometres from the older plants, two of which continued to operate. The paper-making mill introduced a four-shift continuous 168 hours weekly operation. Both in the metal processing and rolling mills, the functions and work of existing departments were reshuffled.

The responsibility for organising and supervising the studies was assigned to the Rationalisierungs Kuratorium der Deutschen Wirtschaft E.V. by the Ministry of Labour of the Federal Republic of Germany. Dr. Burkhart Lutz was engaged to direct the investigation and co-ordinate the research which was done by two independent investigators. Alfred Willener did the field work and wrote the reports and evaluations for the metal processing and steel rolling mills and Dr. Friedrich Weltz for the paper-making mill and the government department. Both investigators visited the plants, had access to the documents and discussed the problems with representatives of management and the staff. Both investigators followed the Guide for Case Analysis provided by the Social Affairs Division, adapting it to the particular features of the individual cases.

The most pronounced characteristic of the labour market in which these adjustments were made was its tightness and severe labour shortages. Therefore considerable stress was placed on internal transfers and upgradings and methods for attracting new additional labour.

The most advanced systems of personnel planning were to be found in the rolling mill and the governmental agency. The labour manager of the rolling mill was a member of the management committee in charge of personnel policy in the widest sense and supported by a strong union. He therefore exercised a dominant role in projecting demands and preparing for recruitment, as well as getting personnel considerations recognised in the plan. Demands for personnel by operating departments were checked both as to qualitative and quantitative characteristics. Civil service requirements imposed the need for careful and formal staff planning in the Pension Department so that " established plans " were carefully elaborated and finally reviewed by the central personnel department of the organisation. The requirements for the less skilled jobs were based on projections set by the firm supplying the equipment.

In the paper-making mill, manpower planning was part of the special technical planning committee but the personnel department was not included. The lack of experience with four-shift operations and the new machines, and the absence of a careful study of personnel, made it necessary to improvise and caused personnel difficulties. Certain general principles were adopted such as trying to keep the age of the workers on the new machines low in order to reduce accidents. In the metal processing plant, the planning was never adequate. The authority of the individual management officials was only defined at the time of the changeover and the personnel department did not participate in the detailed review of programmes or in co-ordinating technical and manpower needs. Short-term views on personnel predominated and difficulties were only surmounted in an expensive and previously unforeseen manner.

In the case of both the Pension Department and the steel rolling mill, systematic programmes of co-ordination were followed, but adjustments were made to realities of operation and the labour market. In the former reliance was placed upon normal wastage to take care of the redundant group and the high age of the personnel made this feasible. Recruitment of new workers could be done within the Civil Service by transfers, and some were recruited in the open market. In the steel rolling mill the gradual introduction of the new production process permitted the progressive employment first of senior technicians, then the " elite of workers ", the " nucleus of workers ", the complete crew for the first shift and finally the second and third shifts. In following this process of recruiting from the top towards the bottom, some key men were engaged three and a half years ahead of the production so that they could help in the actual breaking in of the crew and the initial starting up period.

In contrast, the metal processing plant did not meet its original technical time schedule as it lacked personnel. There was no plan or definition of the quality of labour required or the time at which it would be needed. Without clear specifications, and in face of the fluctuations in demand, the personnel department could not meet its responsibilities. While the paper mill had a knowledge of its needs, it had to await approval for Sunday work before it could institute the round-the-clock operation. To meet the local shortages, a number of programmes were improvised including the use of the contractor's staff.

Since most companies were in need of larger forces and could not easily recruit new ones, they relied on normal wastage and job transfers to take care of the redundant workers. The rolling mill was unable to turn to refugees, who had hitherto been a large resource, or employ foreign labour in great numbers, and so promoted young workers, sought economies in operations in other departments and redesigned jobs for employing less skilled labour, such as preventive maintenance in place of traditional methods. It also bought another plant in the community to acquire this labour pool. The paper mill upgraded its personnel and recruited people, often before the jobs were clearly defined, into a " general works " pool for later assignment. The metal processing department turned to foreign labour and redesigned jobs for the employment of women. Both the paper mill and metal processing plants improved their wage systems to hold their employees.

One factor which facilitated the acceptance of the changes was the general tendency to upgrade work and the pleasanter surroundings which accompanied the new operations.

Training systems were instituted in most companies to meet their new needs. The major exception was the metal processing company. The paper mill sent some of its technicians abroad to examine the operation of the new machines whilst lower level employees were trained on the old machines. Moreover, careful instructions were given on the new shift arrangements. Shortened on-the-job training courses were provided in the steel rolling mill. The Pension Department had some of the personnel trained by the computer manufacturer.

The degree of consultation varied considerably. The steel rolling mill reflected the most intimate relation between the works council and the management. The Pension Department secured an agreement from its staff Committee of the various changes and the manner in which they would be introduced and the terms of transfer.

The works council in the paper mill was instrumental in persuading the trade union to support a request for Sunday work and it also negotiated other improvements in wages and benefits to assure the maintenance of bonus and overtime benefits which had been previously acquired. Only in the case of the metal processing company did the management hold back on its contacts with the works council. But, on the other hand, to secure the employees' co-operation in the operation of the new plant, they negotiated full agreement on new benefits.

Many were the problems experienced through the period of adjustment but the programmes proceeded in this period of severe labour shortages by reason of the numerous efforts made by management to meet the workers' expectations in the form of wage benefits and facilities and ultimately consideration for their personal needs. Where careful plans existed, adjustments had constantly to be made; those who worked without careful plans or encountered many unforeseen obstacles in operating the plants or recruiting new labour were pressed to devise temporary and new solutions. The pressure was upon management to find these answers as they were the prime movers in getting the plants to operate effectively.

Case I

THE INTRODUCTION OF FOUR-SHIFT WORKING IN PAPER MANUFACTURE

I. INTRODUCTION

1. *Description of the factory*

The factory A, which is under consideration, is the biggest of four paper-mills belonging to firm Z. The firm mainly produces bulk paper. Total output for 1959 was 181,600 tons of newsprint and other varieties of wood-pulp paper of medium-grade fineness. Although output more than doubled between 1950 and 1959, from 78.5 to 181.6 thousand tons, it was barely possible to maintain the firm's 20 per cent share of the increasing consumption demand.

Factory A, which produced over 55 per cent of Z's total output during these years, is devoted exclusively to the manufacture of newsprint. With an output of 95,000 tons in 1959, this factory accounts for 40 per cent of home production which corresponds to 20 per cent of the total consumption.

Factory A is situated in the middle of a mainly agricultural region on the banks of a river, on the outskirts of an Upper Bavarian mediaeval county town. It was established in 1887 as a woodpulp factory. Decisive factors in choosing the location were the recently built railroad, the water power obtainable from the river, the proximity of a coal-mine and the well-forested surrounding countryside which guaranteed a good supply of raw material.

Paper production was started in 1906, with two machines and a capacity of 80 tons per day, increasing over the years to 110 tons per day. In 1938, shortly before the outbreak of the war, a new machine was purchased, but it was not until 1951 that the firm was in a position to acquire the necessary power transmission equipment to put the machine into operation. With this machine and another one installed in 1956 it was possible to increase the daily output to 320 tons.

Apart from the coal-mine, this paper factory was until 1950 the only industrial undertaking of any size in the regional labour market. The numbers employed rose gradually to 360 before, and to 700 after, the new machines were put into operation.

In latter years, the wage level in Factory A was higher than that of other enterprises in the same area. This was largely due to the three-shift system employed. This, together with the construction of workers' dwellings and the provision of an old age pension scheme, placed the firm in a strong position on the local labour market.

2. *Determining factors in the change*

a) *The market situation*

The situation in the German newsprint market changed considerably after 1950. Consumption rose sharply — by 100 per cent between 1950 and 1956 — and the German paper industry was unable to keep pace with it. There was a sharp rise in imports, particularly from Scandinavia where modern types of production plant, operating under the most favourable location conditions, were producing far more than their home market could absorb. The surplus supply depressed the world market, and in Germany the result was a steep fall in prices which fell further with the removal of the customs duty. At the same time the German producers were faced with increased power, labour and raw material costs.

b) *The technical situation*

During and after the war, the German industry lost the leading position it had previously occupied both in the manufacture and in the operation of paper machinery. At this time very great strides were made in the United States where the new, and speedier, " pick-up " process was developed.

Twenty of the modern machines, with a width of between 6 and 8 metres, were already in operation in North America in 1959. Eight of them were either planned, being constructed or in operation in Finland and Sweden, while only three others were in the planning stage in Western Europe — two in France and one in Italy. Until 1959, there was no machine in Germany with a width of more than 4.50 metres.

c) *Labour regulations*

It has been proved in the manufacture of bulk paper with large modern machines that it is very uneconomic to interrupt operations. Modern cellulose and paper production plants in the United States, Canada and all European countries are now operated solely on an uninterrupted basis.

The situation in Germany, however, was determined by the general prohibition of Sunday work dating from 1895. This placed the German paper industry at a disadvantage vis-à-vis foreign competitors. On the home market the competitive position was not uniform, since a factory in Northern Germany, because of its comparatively modern plant, had succeeded in obtaining an exemption. But the opponents of Sunday work feared that if further exemptions were granted the practice might become too widespread.

3. *The decision*

By the end of 1959, the management of Z found themselves faced with two alternatives: either to give up entirely the manufacture of bulk paper and to go in for the more expensive special varieties, or to effect a thorough modernisation of the technical plant. They adopted the second solution.

Study tours in competing countries convinced them that if the transport charges on raw material and power were not excessively high, the proximity of Plant A to the consumer market could outweigh the location advantages of the foreign manufacturers using the same production methods. Moreover, a careful analysis of conditions abroad had shown that a further fall in prices was unlikely.

The situation in regard to labour legislation was still very uncertain. The risk of Sunday work being forbidden was consciously accepted. On the home market at least, it would still be possible to compete again on an equal footing.

4. *The changeover*

The average daily output of Factory A in 1959 was 310 tons of newsprint from four machines, two of which (numbers VI and VII) dated from 1904 and 1909 and had a combined output of roughly 100 tons. The other two machines were Number III installed in 1959, and Number VIII installed in 1955, which produced the remainder of the output in approximately equal parts.

It was decided to order a new machine with a width of 6 metres, a maximum construction speed of 750 metres, and a possible daily output of 300 tons.

This was too big an *additional* capacity for several reasons. The supply of wood from the surrounding forests could not be expanded, and the extension of the auxiliary plant necessary for producing pulp and supplying power would have involved heavy additional investments. Finally, such an increase in output appeared to be too great for the newsprint market. But by transferring Machine VIII to another factory and stopping the older Machine VI, Factory A was able to take over the operation of the new machine IX.

The continuous operation system required further changes, but only the most necessary were carried out immediately. The others would have to wait until the legal position was finally clarified. For technical reasons, continuous operation was planned for two paper machines, no. III and the new machine, no. IX. Only those parts of the plant which were directly related to continuous production were also to run continuously.

The three-shift system was retained in the case of the third and older Machine VII since here the rising costs of wages would be out of proportion to the additional output.

II. PLANNING AND PREPARING THE CHANGEOVER

1. *The planning body*

A planning committee was set up under the chairmanship of the business manager of Factory A. It was composed of the technical manager and those plant engineers directly responsible for production planning and control. The heads of the various sections such as construction, steam and power, electrical equipment, material preparation, etc., were called in for consultation in respect of their particular spheres of responsibility.

In the initial stage of investment planning, this body's task was to put the ideas concerning the new plant into concrete form, to adapt them to the existing plant and to work them out to the point when tenders could be sought.

Once the orders were placed, the delivery dates were fixed by the planning body and the deliveries co-ordinated. Since altogether 27 firms were taking part in the construction scheme, this operation was quite extensive.

2. *Collaboration with the supplying firm*

As the members of the committee were given the planning tasks in addition to their other work, it proved necessary to delegate some tasks to supply firms. The job of supervising all the assembly operations, both of their own components and those of other firms, was entrusted to the engineering firm V which, as the supplier of the paper machine itself, was the most important supplier. To make up for this work, all the testing and adjusting operations, which are normally done by the engineering firm, were assumed by technicians from Factory A.

When the assembly began, the chief development engineer from engineering works V was transferred to factory A together with the assembly team. Extensive integration was effected with the planning committee already there.

The completion dates were November 1961 for the machine hangar, and June 1962 for the paper machine and power equipment. Following a trial run, 1st August was to be the starting date for continuous production.

3. *New methods of operation*

Hitherto, watching the band of paper and operating the hand-wheels were essential features of work on the machines. These are now replaced by observation of the measuring instruments, variations being corrected by automatic aids. Manual intervention is rarely necessary. Basic adjustments, which were formerly the machine foreman's responsibility now have to be carried out by specialists.

The transmission of information in the 150 metre-long hangar, filled with the noise of motors and pumps, was improved by the installation of a notice board which displays the data ascertained during operation in such a way that it is visible at a distance and draws attention to deviations from normal running by means of light-up signals. Furthermore, in the case of excessive deviations, breakdowns or tearing of the paper, a siren comes into action. These optical and acoustical signals ensure more rapid alerting of the staff who are tired by continuous watching but little activity.

4. *Legal requirements*

The problem of getting the authorisation for continuous operation from the Ministry of Labour was solved only shortly before the machine was put into operation. At first, authorisation was granted only for a limited period to meet initial difficulties. It was not until a year later, as a result of the Federal decree concerning exceptions to the prohibition of Sunday and bank holiday work in the paper industry, that it became possible and worthwhile to take the necessary steps for the definite introduction of the four-shift system of production.

5. *The shift plan*

Having regard to the anticipated official arrangement, and from preliminary discussions with the trade unions, it was certain that continuous production, if possible at all, would be so only with at least 26 free Sundays.

Efforts to take account of all the claims put forward resulted in the following shift plan:

	SUN.	MON.	TUES.	WED.	THURS.	FRIDAY	SAT.
1st week	0	0	0	x	x	x	x
2nd week	x	x	x	0	0	x	x
3rd week	x	x	x	x	x	0	0
4th week	0	x	x	x	x	x	x
5th week	0	0	0	x	x	x	x
etc.							

0 ... Time off (24 hours).
x ... 8-hour morning, midday, or night shift.

In one round, which was repeated every four weeks, a rest interval of two or three full days was ensured after an average of seven days duty on an eight-hour morning, midday or night shift. The exact shift sequence was repeated only after 24 weeks. This gave rise to a good deal of confusion at the outset.

The free Sunday at the end of the fourth week or at the beginning of the fifth week could be secured only by including workers from sections of the plant not engaged in the continuous production process. These so-called " non-stop assistants " were mainly recruited from the workshops.

III. CONSULTATION AND NEGOTIATION

1. *Opposition to continuous production*

The introduction of the continuous system of production encountered considerable opposition. Both State and Church authorities feared a massive undermining of the institution of the Sabbath. The trade unions manifested " concern for the family and the social structure ". Only the works councils sided with the management.

A visit of inspection to a factory where the continuous production system was practised was a decisive factor in the attitude of the workers' representatives. In personal conversations with their colleagues and with workers, the members of the works council became convinced of the advantages of the system and as a result of joint efforts the trade unions were finally persuaded to refrain from opposing its introduction on a trial basis.

2. *The ballot on the four-shift system*

Since government approval for the introduction of continuous production was doubtful up to the end of May, meetings to inform the staff were not held until early in June 1962. The works council reported on the proposed new arrangements and drew particular attention to the advantages contained in the works agreement already negotiated in secret.

The reaction of a large part of the staff was one of distrust because of the union's previous opposition to the scheme, and there was strong pressure for an immediate vote.

The vote was held on the 8th June after representatives of the management and the union had explained their views.

The result of the secret ballot, in which only shift workers had voting rights, was 144 for and 110 against.

3. *Further information*

Once agreement to the introduction of the continuous system had been obtained, the new plans for the filling of posts, together with the shift plan, were posted on the notice-board. Verbal instructions were also given to the shift leaders about the changeover dates for the different work-groups.

4. *Settling wage problems*

Because of anticipated opposition from the staff to the introduction of four-shift production, provision was made for certain concessions in regard to the remuneration of the shift workers, as well as the reduction of the working week from 44 to 42 hours.

Internal negotiations between the management and the general works council led to the conclusion of agreements which included such provisions as supplementary rates for late and weekend and bank holiday shifts, additional output bonus for the newly added shift, and the grant of a " weekly lump sum " to compensate for loss of overtime.

The increases represented a wage rise of about 15 per cent for the individual worker. At the same time, the factory's total wages bill increased by over 25 per cent. Since the number of additional workers engaged in connection with the changeover was small, this indicated a shift towards the more highly paid jobs.

IV. DETERMINING MANPOWER NEEDS

1. *Responsibility for manpower planning*

Manpower planning was regarded as part of technical planning. Consequently the committee already referred to was also responsible for this activity.

Factory A has not a staff section of its own. The committee therefore had the task not only of fixing the basic principles of staff selection but also of filling each individual post. For certain questions, the works council shift foremen were consulted because they were better acquainted with the workers concerned. The department heads who would later on have to work with the staff selected were also consulted.

The problem to be solved was twofold. A suitable team had to be found to man the new paper machine IX, and crew lists had to be drawn up for the planned four-shift production system in the other sections of the works.

2. *Underlying concepts*

The basic consideration in staff planning was to transfer existing surplus manpower to those sections of the plant intended for four-shift production, so that complete teams could be formed. Replacement workers for holidays and sick leave would be provided by fresh recruits who would be trained for many different tasks so that their numbers could be kept very low. At the start gaps could be filled by withdrawing from the workshops craftsmen who were earmarked for Sunday shifts in the new shift plan. In the event of fairly serious damage occurring after the firm's own craftsmen had already been placed on production work, outside contract workers could be engaged on loan from other firms.

3. *Quantitative determination of staff requirements*

Notwithstanding the new types of instruments and automation, it was impossible to effect any economies in manpower. The continuous production system entailed new tasks and involved several other branches of the plant: water and steam power, boiler-house, wood barking and cutting departments, circular cutting machine and laboratory, to mention only the most important.

Determination of the number of workers required for the four-shift system was rendered more difficult by the fact that it was not simply a question of being able to assign four men to each working post instead of three as hitherto. Because of the sharp increase in the wages bill called for by the fourth shift and the particularly expensive Sunday and holiday shifts, greater efforts had to be made than heretofore to dispense with every superfluous man.

The staff requirements on the machines were that instead of twelve crews on four machines with three shifts, only eleven crews were necessary — eight for the two four-shift machines, and three for the other. Workers released from the machines could be transferred to other branches of the works requiring additional manpower for continuous operation.

4. *Recruitment*

Despite all the economy measures, it was impossible completely to avoid recruiting additional staff. Such recruitment was based on the following guiding principles:

a) In order not to overstrain the regional labour market, new workers were not to be recruited at a fixed time.

b) The newly recruited workers were not to be assigned immediately to the new posts but were to be allocated to the "general works", whence they could be withdrawn as required.

It was hoped that this method would afford several advantages:

a) Mistakes in the operation of large sensitive machines can have very costly consequences, and the period of probation for new recruits was therefore important.

b) More time was available to familiarise the new recruits with the jobs they would occupy after the changeover.

c) By assignment to the " general works " rather than to defined jobs, it was possible to maintain the tolerance in replacement staff which was necessary until needs were ascertained.

d) Dismissals which might become necessary would be easier to effect than if these workers were already formed into compact groups.

5. *Principles of selection*

Because of the need for speed and freedom from breakdowns, it was necessary to avoid a rise in the accident rate which frequently occurs where a new complex is being run in. In 1956 and 1957 for instance, there was a very sharp rise in the accident rate after the running-in of machine VIII. An analysis of statistics showed that trained workers aged between 25 and 40 have the lowest percentage of accidents. Since this age group also have the highest level of output, it was decided to base qualitative selection on the following principles:

a) Only younger, but already trained workers, with a fairly long period of previous employment and experience in the works, should be assigned to the two modern machines III and IX, which were intended for four-shift production.

b) Responsible posts, especially on machine IX, should also be filled by young men, even though this might conflict with the hierarchical principle of gradual movement upwards.

c) Older skilled workers and new recruits should work on machine VII, which operates only in three shifts.

The application of these principles was facilitated by the closing down of two machines and the introduction of four-shift production which made a complete re-organisation of the work teams necessary.

6. *Increase in specialist staff*

The technical sophistication of the new machines rendered necessary a further increase in the staff strength which, though small in numbers, sharply influenced costs. More engineers with a university or technical school training were needed than before for adjustments and repairs to the delicate mechanical and electronic control elements, as well as for supervising production.

7. *Use of contractor's staff during assembly period*

Since the factory was short of craftsmen, it was decided to employ assembly teams supplied by the contracting firm. These were only to be reinforced in the final stage by the ordering firm's workers so that the latter might familiarise themselves with the power transmission system and peculiar structural features of the machine.

The original intention was to use as few outside fitters as possible because of the high costs involved. However, a number of advantages led to their being employed in greater numbers, even after termination of the assembly operations:

a) Partly for prestige reasons, only very trustworthy workers are assigned by the contracting firms to outside assembly operations. Moreover, any unsuitable worker can be sent back at once by Factory A.

b) On certain holidays specified in the works agreement, Factory A closes down completely and none of the firm's own men may work. On these days repairs which are possible only when the machinery is stopped can be carried out by outside fitters who are not bound by the works agreement.

c) By employing outside fitters for repair purposes even after the assembly was completed, it was possible to tide over the shortage of craftsmen until a corresponding number of apprentices had completed their training.

On the other hand, a comparison of wage costs shows that outside manpower is roughly 20 per cent more costly than one's own. Another drawback is that the fitters themselves do not like working in outside plants. In addition to being separated from their families, they feel that they are being " sold below their value ". This is due to the fact that only qualified skilled workers, without their assistants, are engaged and they therefore have to do the lower grade jobs as well.

8. *The changeover period*

The plan was to transfer the staff and to man the fourth shift *before* the introduction of continuous production so that starting difficulties would not coincide with an unfamiliar shift system.

It was also intended to organise staff so that only machine IX would at the outset receive the team finally assigned to it, reinforced by two shifts from Machine III, while the other machines were not yet to be operated with the men intended for them. This situation was to be maintained until Machine IX was operating satisfactorily. Only then was the demolition of machine VIII to be started and the changeover to the four-shift system to take place on Machines III and IX. It was estimated that the transition period would last about three months.

In the other sections of the plant the fourth shift was to be formed simultaneously with the starting of Machine IX, even though the four-shift system would not yet operate. In this way, the new teams were to be trained and the subsequent transition made easier.

The changeover was greatly facilitated by maintaining Machine VII and its production on the old shift system, because this made it possible to avoid discharges, premature retirements on pension, or transfers to less well paid jobs, especially in the case of the older workers who would have been affected. In this way, although it was impossible to put them on the higher wage rates or to allow then to benefit by the reduced hours in the continuous production branches of the works, they were nevertheless not worse off than before.

V. TRAINING

1. *Theoretical training*

During the three months preceding the date planned for starting the new machine, training courses were conducted by the director for technical planning from the firm supplying the machine. Participation in these courses was optional. The invitation was accepted only by the senior technical staff, and it was therefore decided that the rest of the staff would be given instruction by the machine foremen.

2. *Training in outside plants*

The close collaboration which took place with the engineering factory was of great value in the training of the teams for Machine IX.

Several years before this machine was ordered, technicians and some of the operating staff from Factory A were invited to assist at the engineering factory on the starting of a paper machine which was being sent to Chile. Although this machine was smaller, it gave them an opportunity to become familiar with the new production technique.

In addition, the Swedish and Finnish firms who had purchased sister machines allowed two paper machine operators and one engineer from Factory A to spend a fortnight in 1962 watching the starting of their machines. As a result, certain constructional defects were able to be eliminated which these firms had spent a lot of time in locating.

3. *Training on the machine*

It was intended, by combining older skilled workers with new recruits on Machine VIII, to give the latter a better training than they would have got on the new machine. The process of paper production can be followed more easily on the old machines because they run more slowly and are not closed along their sides.

Subsequent re-training on the new machine is not difficult, since the technology of the production process is similar on all machines. Furthermore, it is being facilitated by the interchangeability of the operating staff.

Contrary to previous practice, no importance was attached to training young workers to a basic knowledge of the structure of the machine and its detailed functioning. Their training was concentrated instead on developing speedy reflexes and precision in operating manual controls.

Because of pressure of time, it was impossible to wait until the entire new assembly was completed, and training had to be begun as each part of the complex was erected. Since, however, the men could not yet be moved from their old jobs, it was necessary either to thin out the shift teams or to sacrifice free time.

VI. RESULTS

1. *Running-in period*

In Factory A, they were aware of the heavy costs involved in a long running-in period and for that reason all efforts were concentrated on cutting down this period as much as possible. Important prerequisites for this were careful selection of workers, training of the operating teams and, above all, familiarity with experiences abroad.

The start was so smooth and promising that at the end of a week it was possible to begin to remove Machine VIII, which was originally planned to take place three months after the running-in. It was also possible to keep the running-in period extremely short. The starting date was the 22nd June, 1962. Already in July, an average quantity of 85 tons of saleable paper was produced over a period of 20 days, though it is true that the proportion of wastage — 38 per cent — was still very high. In August, the saleable output was already over 140 tons per day while wastage had fallen below the critical 20 per cent limit.

When continuous production was introduced, a good deal of confusion occurred at the outset because of the new shift sequence. To prevent mistakes, each man was provided with a plan showing the shift corresponding to each day of the month. The plan was produced in small format so that it could always be carried in a pocket-book. All mistakes ceased promptly.

At the changes of shift the relieving workers voluntarily adopted the custom of arriving on duty about 20 to 30 minutes before the official shift change, thus ensuring that the machine never remained unattended.

2. *The period following the changeover*

In the two years following the changeover opinions were formed about the continuous system of production which are referred to here because they furnish a good idea of the effects of the measures adopted.

a) *From the management's viewpoint*

It was calculated that the abolition of the weekly stoppage on Sundays would lead to increased output of between 7 and 9 per cent.

A comparison of the figures is possible only on Machine III, and shows that during the first year (1963) there was no increase in output despite the extended operating-time. The results for the first half of 1964 imply an increase of 7 per cent, which corresponds approximately to the extended running-time.

The reason advanced for this was that the newly constituted operating teams took time to get used to the machine. Only 15 out of the 30 men concerned were employed on this machine before the changeover.

The advantage of completely reconstituting the shifts was that individual workers were not introduced as outsiders into existing groups. Thus, all the workers had to make an effort at collaboration. This also facilitated the introduction of craftsmen as " non-stop helpers " which in turn helped to reduce the tension between them and the production workers.

It is hoped that the longer rest intervals of at least 48 hours between shift changes under the four-shift system, compared with at most 24 hours under the three-shift system, will have a favourable effect on sickness figures, but reliable statistics are not yet available.

From the point of view of business economies, the plant has become less elastic in regard to employment and sales fluctuations. An extension of production on Sundays to meet increased orders, is no longer possible, since production takes place on Sundays in any case; and because of the higher wages, which on a short-term basis have the character of fixed costs, a downwards adjustment in case of a drop in orders is very expensive.

b) *From the workers' viewpoint*

It became clear from conversations with the works council that the popularity of the four-shift system has increased considerably since the date of the ballot. It is estimated that nearly 100 per cent of those involved are in favour of the system. Decisive factors are the high rate of remuneration and the long periods of continuous free time. Isolated complaints are said to have been received from older workmen that they suffered from nervous disorders such as loss of appetite or headaches as a result of the four-shift working system. But similar complaints are said to have been expressed before by workers in this age group while men under 50 had not complained. It was denied that these complaints had any connection with the four-shift system.

The principal opponents of the four-shift system are stated to be those craftsmen who are not involved in it. For them the well-paid Sunday work no longer exists and they are the only persons in the factory to have suffered a loss of earnings as a result of the changeover.

It was particularly stressed that on account of the new shiftplan, there was a longer advance knowledge of free time than in the past, and that this made it possible to plan leisure activities. Under the old system, a shift team was employed regularly every third Sunday, according to a precise plan for repair and cleaning operations. But the shift rotation was frequently upset by the sudden need for major repairs or by the fixing of production Sundays at short notice. Under the new system an employee had to work more frequently on Sundays, but he knew exactly when it would be his turn.

Opinions were divided as to the popularity of the free week days. Ski-runs and swimming baths, as well as popular places of excursion, are not so overcrowded as at weekends. On the other hand, cultural and sports events are concentrated at weekends.

Sunday continues to be a special day in the mind of the workers. If it is necessary to work on this day, they are glad to have cleaner and lighter duties than before, when repairs had to be carried out.

Case II

DATA PROCESSING AND MANPOWER SAVINGS IN PUBLIC ADMINISTRATION

1. INTRODUCTION

On 1st April, 1958, an IBM 650 was put into service in a large public administration in Germany to compute the salaries of more than 100,000 employees, and to establish the entitlements and payments relating to 84,000 retirement pensions. This report deals solely with the mechanisation of file data processing and its effects on the Pension Department.

1. *Operation of the Pension Department before introduction of the computer*

The Pension Department is in two sections, the first determining gross entitlements, and the second calculating and making net payments.

The establishment of gross entitlements demanded a substantial volume of work, owing to the complexity of government legislation. Not only did the legal differentiations involve a great deal of work at the stage of initial calculation, but the frequent legislative changes, and the adjustments in wages and rates, rendered the revision of most or all the files a recurring necessity. Until April 1958, all this work, with the exception of two stages, was totally unmechanised. It took up as much as 70 per cent of an Entitlement Officer's time.

When a file was first opened a provisional entitlement was determined. Subsequently transforming this into a final entitlement was a lengthy business up to eight hours per file.

The calculation of net payments took place in the Accounts Section on the basis of a Pay Order issued by the Entitlement Section. Taxes were deducted to arrive at the net sum payable, details were registered on a docket in the name of the beneficiary, and after checking and signature by a superior, advice of entitlement was issued.

Monthly payment of pensions then followed, using various media: postal orders, transfers into post office accounts, and payments into banking accounts. Pay lists had to be prepared and cheques had to be made out. This last stage was mechanised: the pay lists were produced in the Statistics Office by tabulating machines of the punched-card input type, and the cheques were printed by the automatic addressing department. These documents had however still to be checked and signed by the Accountants, who also had a great deal of up-dating to undertake, owing to such factors as changes of address and changes in taxation rates.

2. *Reasons for change*

The situation in the Pension Department was unsatisfactory for a number of reasons. With the staff available, it was not possible to revise the files rapidly enough for the frequent legislative changes. The resulting delays gave rise to frequent inquiries, visits, and complaints, which further retarded the work of revision.

The result was a considerable overload of work. Overtime was unavoidable, and led to protests by the unions. The situation became even more acute upon introduction of the 45-hour week. In addition to all this, the age structure of the Department's personnel gave rise to anxiety. A substantial volume of retirement could be expected within a few years, and labour was not easy to get.

3. *Introduction of a data processing system*

The idea of using a computer came to the forefront in the autumn of 1956 when the suggestion was made to examine the possibility of introducing data processing in management. This involved finding the answers not only to technical and economic questions, but also to questions of administrative competence and responsibility.

A seminar for the exchange of information was organised for members of the Administration and representatives of the manufacturer. At the same time, employees in the Pension Department co-operated with representatives of the company in preparatory work. By January 1957, the first programming tests were run. In March 1957, the project received a degree of official sanction. The manufacturing company detached a permanent representative to the Administration offices, and the Administration officially assigned members of its staff to undertake preparatory work for introduction of the system.

Finally, in August 1957, after the first programmes had been successfully tested and it was apparent that introduction of the system was not only possible but also economically sound, the decision was taken to hire an IBM 650 as from 1st April, 1958. It was further decided that all operations for mechanisation should be converted simultaneously.

Starting on 1st April, 1958, the pensions of about 60,000 persons were computed and made payable by the new system. During the first four months clerical processing continued, ceasing finally in July 1958.

Shortly after installation of the IBM 650 its replacement by an IBM 1401 was already being planned, since the capacity of the 650 was not large enough to deal with the wages of the clerks and other labour grades in the Administration, as was required. The IBM 1401 became operative on 1st April, 1962, but because of the time needed to adapt the various programmes for the new machine, the 650 remained in service until August 1963.

In addition to a higher capacity, the 1401 was expected to effect substantial reductions in the staff requirements of the Computer Centre. In fact the reduction was less than expected — from 72 in 1961 to 61 in 1964, instead of to 44. This was mainly due to the existence of a group of temporary assistants who were placed at the disposal of other departments to help in preparing for mechanisation.

Employment figures were also swelled by another group which was responsible for organising the centre and for maintaining liaison with the Administration offices.

Introduction of the data processing system justified itself economically in a short time: total costs in 1960 were 1,445,000 DM (of which 640,000 DM were for the computer), against savings of 2,116,000 DM in the Administration offices. A net saving of 671,000 DM was thus effected.

II. CHANGES IN THE PENSION DEPARTMENT

1. *Procedures*

In the Entitlements Section effective time-savings after complete conversion were greater than expected. Most significant was the load taken off the Entitlement Officer in the periodic adjustment of pension payments due to legislative changes. It was in part possible for the computer to make adjustments unaided, on the basis of existing punched input data. In such cases, the Entitlement Officer had merely to check results, the work of a few days, as against the six months or so previously taken up by such revisions.

In the Accounts Section, conversion produced more substantial effects, since documentary compilation — which could not be mechanised — was a smaller job than in the Entitlements Section. Further, a large part of the quite extensive clerical work involved in sending out notifications, establishing pay lists, making out cheques, etc., could be taken over by the machine.

2. *Organisation*

The Pension Department was re-organised about a year after mechanisation. Previously, the Entitlement Officer had processed cases more or less completely. The Section was now divided into groups of four to six Officers under a Group Head. The job of the latter was to check and sign awards, and to process legislatively complex cases himself. A special group was formed to develop final awards from provisional assessments, this group also acting as a manpower reserve for the replacement of Entitlement Officers on holiday, sick, etc.

The Accounts Section was also sub-divided into groups allocated to each Entitlement Section group. This produced a closer connection between " gross " and " net ". It also made for greater flexibility since group heads could now draw on the accountancy groups under their control to assist the entitlement group, and vice versa.

Finally, a special job was created, namely liaison with the Computer Centre.

In all this, the difficulties being dealt with were of long standing, but had become more acute since mechanisation. The avoidance of bottlenecks was now much more important, in view of the shorter processing times and the necessity of feeding the machine rapidly at its full capacity. Mechanisation thus forced a re-organisation that was already due.

3. *The grades structure*

As seen from the foregoing, electronic data processing and re-organisation of the Pensions Department changed the nature of the work of Entitlement Officers and Accountants, both now having more cases to deal with but less work to do on each.

For the individual Entitlement Officer, introduction of the data system firstly eliminated a mass of calculation and writing. As the number of cases submitted to his assessment was now much greater — about 700 against 400 — the change meant the concentration of his efforts on higher grade tasks.

At the same time, the change *did* reduce the variety of his work through the appointment of Group Heads, responsible for the processing of the more complicated — and therefore more interesting — cases. Developments in the Accounts Section were similar: the Accountants had no more monotonous computing and registration work to do, but were also faced with a certain " standardisation " of the processes in which they were engaged.

Parallel with this change in the work of the individual, there came a shift of weight in the grades structure of the Department towards the higher levels, with a shrinkage in the proportion of employees engaged on purely repetitive simple work.

III. STAFF PLANNING

1. *Responsibility for staff matters*

In addition to the technical and organisational planning, preparation at the personnel management level was required: the number of new posts had to be determined, the qualifications specified, and the posts filled. Finally, an assessment of the foreseeable consequences — above all the possible manpower savings — had to be made.

Many offices in the Administration are concerned in staff matters. There is a chain of command on the personnel side which is parallel with the departmental chain of command. There is also an establishment office, which is concerned with the determination of the Administration's establishment, and an organisation department.

The staff policy in a public administration is quite extensively determined by general and sometimes legislative rulings, and is therefore largely beyond the jurisdiction of any single office or authority.

One of the most powerful instruments of staff policy in the Administration is its establishment plan. Any change in the Administration which affects its establishment must first have been allowed for in the establishment plan, particularly when the change involves the creation of new posts.

The binding nature of the establishment plan stipulates a highly formalised staff policy. And yearly submission of the plan in the budget makes relatively long-term planning a pre-requisite.

2. *Staff planning in the Pension Department*

a) *The establishment plan*

In addition to accelerating the work-cycle, the aim of introducing the data processing system was to reduce manpower requirements.

At the beginning of the conversion process, the heads of offices, sections, etc., received a circular asking for a statement of the work done by their subordinates. Estimates of the time-saving foreseeable, based on their replies, were: 8 per cent, Entitlements Section; 50 per cent, Accountancy Section; and 12 per cent, Clerical Section. This represented 115 future redundant posts within the Pension Department.

But the avoidance of dismissals and transfers was an essential consideration, in fact almost a condition of acceptance of the mechanisation project. In this connection, the " top heavy " age structure in the Pension Department — one of the reasons advocating mechanisation — turned out to be an advantage.

It was calculated on 14th August, 1957 that by March 1960, 111 retirements were to be expected in the Pension Department (14 by March 1958, 52 by March 1959, and 45 by March 1960). It therefore appeared quite possible to avoid dismissals entirely, and transfers to a substantial extent, achieving the necessary staff reduction simply by not re-filling vacated posts.

This is in fact what happened: by 1960, 107 posts were vacated and not re-filled in the Pension Department. By May 1961, the employment figures of the department had sunk by a further 123 posts: this is equal to about 1/5 of the original employment level before conversion. Since May 1961, no substantial changes have occurred.

The effects of rationalisation are in fact greater than reflected by these figures, the volume of work having increased by a further 4,500 cases in the meantime.

b) *Information to the staff*

Familiarisation with the new wworking procedures was first undertaken by a series of written instructions giving the details of coding, the handling of special cases, etc.

An Entitlement Officer was assigned to the drafting of these instructions, and to maintain liaison with the Computer Centre. He was also responsible for channelling through the group heads verbal instructions to the Entitlement Officers and Accountants, and inquiries from them.

The employees were conducted through the Computer Centre after installation of the system, in groups of about 20. One of the usual staff meetings was held shortly after commissioning of the system, and the introduction of electronic data processing was discussed and criticised by some of the members.

c) *Agreement of the staff commttee*

The staff committee was informed of the project at the very beginning, and invited to attend the most important discussions.

The committee agreed to the staff and organisational changes implied in the introduction of electronic data processing. Agreement was facilitated by the fact that the change in the grades structure would be favourable for a high proportion of the employees, who could expect better possibilities of promotion. It was, moreover, clear that the consequent manpower reduction could be achieved without recourse to dismissals and transfers.

The number of cases handled by each Entitlement Officer was expected to rise gradually, and the staff committee took part in the discussions concerning the maximum permissible level of increase.

The joint committee of administration employees and pensioners was also informed of the plans for conversion.

3. *Staff planning in the Computer Centre*

a) *The establishment plan*

At the beginning of operation in April 1962, the establishment plan provided for more than 100 posts in the Computer Centre, but not all of them were subsequently occupied.

In the following years, the establishment shrank considerably. But the number actually employed became and remained greater than its establishment. In 1961, there were 109 employees as against an establishment of 72, in 1964, 61 as against 57.

Whereas the effects of electronic processing on the establishment plan of the Pension Department could be relatively clearly foreseen, the creation of the Computer Centre presented quite new problems.

Firstly, there was no example to follow within the Administration, nor was there any external " parallel " that could be taken as a reliable model. Secondly, the absence of reliable references for the calculation of manpower requirements in the centre, and the rapid expansion of the volume of work taken over by it, involved short-term re-adjustments of stated manpower requirements.

Thus, there were originally more planned posts than employees, and subsequently more employees than planned posts. The latter was probably due to overestimation of the manpower savings possible witht he IBM 1401, and the fact that the centre accepted new tasks in addition to the expected quantitative increase of work.

Finding the personnel required over and above establishment was partially met by temporary transfers and by using emergency reserves and employees under training.

b) *The filling of qualified posts*

The programmers were key-men in development of the centre. In filling these posts, a basic decision had to be taken: should they be filled by civil servants possessing the necessary knowledge of the administrative side, but unfamiliar with computer programming, or should they be filled by outside recruitment, engaging experienced programmers without any knowledge of legal and administrative matters?

It was decided to recruit the programmers within the Administration, on the principle that it was quite possible for an individual capable of abstract and logical mental processes to be trained in programming.

By the same token, the technologist in electronics originally managing the computer centre was subsequently replaced by a civil servant.

Selection of the candidates for the programmer posts was conducted in several ways. In the case of the first three posts filled, conversion was smooth and automatic: the new programmers were formerly employed in positions in which they had already had to deal with the mechanised processing of information, and had shown interest in the new project. Two further programmer posts were filled by direct transfer from the administrative offices, on the request of the Computer Centre.

In the case of the next group, selection was much more formal. At the request of the Computer Centre, various offices — all potential " customers " of the Centre — put forward 26 young inspectors as candidates. Selection criteria were essentially good powers of comprehension, and good final examination results in mathematics. The 26 candidates attended a course with the manufacturers to learn the basics of large-system programming, and were then examined. Those with the highest marks were selected. Later, in 1960, when the number of programmer posts was raised from 7 to 10, one of the other candidates was also transferred.

Two further posts were filled by members of the Pension Department staff familiar with pension law. These took the usual IBM test, and then attended a course of instruction with the company.

Training varied too. In the case of the first group, it was informal and largely the result of working with representatives of the company. In the case of the later groups, most of their training consisted of the course taken with the manufacturing company. There is no official training programme for programmers.

c) *The filling of less qualified posts*

It was relatively easy to determine the number of less skilled posts, since the purposes for which a computer is used have little influence on such jobs as card-puncher, card-checker, tabulator and filing clerk.

The posts were filled in various ways. A group of tabulators, card-punchers, and card-checkers were taken over en bloc, with the manager of the " machine-room ", from the Statistics Office. The remaining posts were filled by recruitment through the press, and by applicants coming directly from industry. The tabulators were selected according to references, and card-punchers on the basis of punching speed. The recruits were experienced, so that no problems of training were encountered.

It was only with the filing clerks — in part externally and in part internally recruited — that a total lack of experience in the work was found.

The reduction of filing requirements resulting from introduction of the 1401 did not lead to dismissals: the redundant personnel were simply transferred to other departments and sections, or to similar jobs elsewhere.

d) *Control of the Computer Centre*

The place of the Computer Centre in the administrative hierarchy was discussed. Its inclusion in the Statistics Office seemed a reasonable step, since this office had so far handled all mechanised work for the Pension Department, and therefore possessed the best experience of punched card equipment. But several reasons led to rejection of this idea, and the inclusion of the centre in the Administration.

The basic reason for this decision was the recognition that the completely new possibilities of electronic computing demanded new working techniques and methods. Automation of the Administration's work required close attachment of the Computer Service to the Administration, and conversely, very good detailed knowledge of electronic processing, in addition to understanding of the legal and departmental aspects, on the part of Administration Officers.

The importance of safeguarding the Administration's interest in formulating the Computer Centre's assignments was clearly understood at an early date, as was the possibility of power falling into the hands of the technologist.

The permanent assignment of the programmers also remained undecided for some time. Originally, they were simply attached to the Computer Centre, with the understanding that once their job was finished they would be returned to their original offices. This was subsequently changed, since continuous reprogramming was necessary and a permanent team of programmers was formed for the Centre.

IV. PROBLEMS OF ADJUSTMENT

1. *The Pension Department*

Introduction of the system in the work of the Pension Department caused considerable disturbance among the staff. This was partly due to anxiety over the reduction in posts and the fears of transfer, which in fact were unfounded. It was also due to the temporary overload of work at the time of conversion. In later conversions premature statements regarding manpower savings were avoided, and additional staff was assigned to assist during the preparatory and introductory phases.

Becoming familiar with the use of codes also seems to have raised some difficulties, particularly for the Entitlement Officers (the Accountants were already familiar with codes through their work of preparing data for automatic addressing and punched card systems). This was a problem for the older men who were in the majority in the Entitlement Section.

At no time, however, did the resistance of the Entitlement Officers actually hinder the progress of work. The fact that there was no stronger reaction may be because the computer system took over the low-grade work which had always been regarded as a burden. It must also be remembered that the re-organisation that followed mechanisation substantially improved the chances of promotion, particularly for Entitlement Officers.

The resistance in the Accounts Section was greater. The work of this Section was much more drastically reduced, and consequently greater manpower savings could be made. Moreover, the nature of the Accountants' job was changed. Documentation in this Section was a very minor aspect of the work compared with working with figures and registering which were directly affected by introduction of the machine. Despite this, resistance diminished with time, firstly, because the more difficult cases were still booked manually, and secondly because the system considerably lightened the Accountants' work, particularly during the recurrent revisions.

In both Sections it was the much larger number of cases handled by each individual that seemed to come in for the strongest criticism. The increase per man in the Accounts Section has been particularly substantial: from between 500 and 600 cases to between 1,200 and 1,400. The feeling of being overloaded may perhaps be strengthened in the Accounts Section by the mass of papers continuously fed out to each Accountant by the machine. In back-dating adjustments, the data that an Accountant formerly found on a single sheet must now be collected from up to ten different forms.

2. *The Computer Centre*

One weakness in the Computer Centre was the fact that each programmer was solely responsible for a given sector. In the absence of any one programmer, none of his colleagues knew the sector sufficiently to be able to take over without trouble. To get round this, the plan now is to form two teams of four programmers each, of which at least one, the Head Programmer, is familiar with the full range of programming.

Difficulties were also encountered in determining the place of programmers in the chain of command. Most of the programmers do qualified work extending beyond the establishment of the programmes themselves. In addition, a large quantity of work was demanded — and produced — by the programmers and liaison people during the conversion period. The willingness of these men was partly due to their interest in the subject, but certainly also largely due to their hopes of promotion.

Fulfilment of these expectations was difficult. Promotion in a public administration is based on definite criteria, particularly the possession of certain academic qualifications, and length of service. The aim is continuity and the endurance of a uniform level of basic qualifications. The promotion system is thus badly equipped to deal with such innovations as data processing, which demand quite new qualifications. The tendency of the younger men, and consequently those in the least senior positions, to aspire to and obtain these new qualifications creates particular difficulties.

Despite this situation, none of the programmers or other qualified officials in the Computer Centre had left three years after introduction of the system, even though salaries of people in equivalent positions in industry were four times higher. This may have been due in part to the persistence of their original hopes of promotion and to their unwillingness to sacrifice the advantages of a career in the Civil Service, but also certainly in part to their attachment to the work, which was regarded as pioneering in a field of undoubted value to the Administration.

Considerable difficulties were encountered in reconversion from the IBM 650 to the IBM 1401. The extensiveness of the reconversion period and the increased cost of working with two computers was due to insufficient programming capacity. It is now clear that it would have been more economical to increase the number of programmers in advance, thereby shortening the period during which the rental of two computers had to be paid.

3. *Co-operation between the Computer Centre and the Administration*

Co-operation between the Computer Centre and the various Administration Offices served seems to be effective. Several circumstances have contributed to this situation:

a) As already mentioned, the introduction of mechanisation did not result in down-grading of the work of the Administration Offices.

b) Working methods in the Computer Centre were modelled on the Administration, and posts of importance in the Centre were filled from various Administration Offices. This may have prevented the Computer Centre from being regarded as a " foreign body ".

c) The way a State Administration operates is suited to data processing, not only because procedures are already substantially coded, but also because of the general formalisation of co-operation between Offices.

There were some complaints from the Computer Centre's management that the Administration was not sufficiently " machine minded ". In mechanical data processing, it is not only essential to keep strictly to schedule, but also to give advance notice of changes, because although the actual processing is very fast, the preparation of data takes time. In clerical processing, preparing and processing times stood in exactly the opposite relationship to each other. Moreover, a difference of two or three weeks was of little significance in the earlier much longer time required to deal with revisions.

It remains to be seen to what extent the Computer Centre has become an integral part of the Administration, or has continued to " lead its own life ". There is certainly a feeling — both in the Centre and Administration Offices — that it occupies a " special " position. This may be principally due to differences in the manner of working, owing to " the machine ". For example, there are differences in length of breaks: 30 minutes lunch break compared with 20 minutes throughout the Administration. There is also a difference in clothing: 80 per cent of the " machine staff " wears white overalls, made available by the Administration for a small fee. The wearing of dark overalls was suggested, but resisted by the personnel.

However, the personnel of the Centre has definitely a " civil servant " attitude, due in part to the situation of the Centre in the Administration building, and also because most of the qualified staff are officials, and were in fact civil servants before 1958.

Case III

PERSONNEL PLANNING A MAJOR NEED IN REORGANISATION

I. INTRODUCTION

This report is based on an investigation conducted during July and August, 1964.

1. *The firm*

This firm is part of the metal processing industry. Its activities include the making of medium and heavy implements in series spanning several years of production; these are processed in many variations of constructional detail. Within a period of 50 years the firm developed from a modest craft to a large enterprise employing several thousand persons.

In the early 1960's the production plant was in need of thoroughgoing reorganisation. Processing was, for the greater part, concentrated in the main plant of the firm, situated near the centre of a large industrial town and long since incapable of any further expansion. A large part of the building dated back to the time before World War 1. Numerous reconstructions and extensions created an unwieldy conglomeration which had lost its usefulness and could no longer cope with a rational production flow.

After the war the plant experienced what is called " an organic growth " and transferred some of its processing or finishing stages to the outskirts of the city to small and medium-sized branch plants. When a competitor's firm collapsed, a plant was acquired several hundred kilometres away. Here too, some of the finishing work took place.

This sort of production structure proved unsatisfactory. Ever-growing competition (with increasing international collaboration and combines) forced the firm to take drastic steps to maintain its market position.

In order to make the required technical reorganisation economically feasible, it was necessary to enlarge the ownership of the enterprise. Thus a large part of the shares went to a group of firms whose technical co-operation was desirable. This group of companies had part of their finishing plant in a growing industrial town nearby. The group was also in a position to provide or raise the necessary capital for the extension and reconstruction of the plant.

The new administration decided to rationalise the entire finishing process, and to erect a new spacious plant in the industrial town X where processing plants of other groups of companies already existed. Here, the finishing processes would be concentrated instead of being dispersed over several other plants as in the past.

The following objectives will be aimed at during the next few years:

a) the main plant (plant I) will be used for administrative tasks and stocking spare parts;

b) one branch plant (plant II) on the outskirts of the same town will limit its activities to the manufacture of parts and the early processing stage;

c) the new plant (plant III) will be responsible for the entire finishing process and for part of those early production stages which, because of their awkward size, should avoid transportation over great distances. Moreover, plant III is to store the end product before delivery — a rather space consuming task.

To begin with, the processing still carried out in the main plant (plant I) will be transferred to plant III, together with certain preliminary operations of lesser significance. Later it is intended to transfer products for finishing from plant II as well, liberating the latter to undertake the most important preliminary work (impulsion components) so far carried out in plant I.

The new plant III is to realise the flow line principle to a much greater extent. This will necessitate a much more rigid planning right from the early stages.

The location finally chosen for plant III had several decisive advantages. The building site was already owned by the combine and was situated adjacent to other production plants of the combine, which would be likely suppliers or likely partners in technical and personnel matters.

The disadvantage of the new site was its distance from the main plant (approximately 40 km) and the domiciles of the staff employed there. It would force more than half of the staff either to change their living quarters or put up with a long daily trek to and from work.

To this should be added that the town where the main plant lies is thickly populated, and many of the staff of this plant are within a short walking distance of work, or can get there with their own vehicles.

2. *The labour market*

The geographical situation of the town where the main plant was situated was outside the zone of general prosperity enjoyed by the Federal Republic of Germany. Nevertheless, even before reorganisation was planned, the typical problems of the general labour shortage made themselves felt.

The management had thought they would be able to find new staff at the site of plant III since the nearby plants of the combine were being progressively mechanised and some lay-offs in these plants were expected. But it was soon apparent that other firms in the neighbourhood absorbed all redundant staff even before vacancies in plant III became available.

3. *Labour turnover*

Labour turnover in the firm had increased during recent years. The repeatedly circulating rumours about the difficulties of the firm (borne out by the fact that a merger proved necessary later on) played a large part in this connection. Experience shows that the fear of loss of employment causes the departure of the very workers a firm can most ill afford to lose. Older staff and invalids hardly ever leave of their own accord. This experience was borne out in this particular case, where the percentage of " social staff " (i.e. war and civilian invalids) is a considerable one.

4. *The organisation of management*

Just as the main plant (which at the time of this study still did most of the processing) bore witness to the development of the firm from its humble beginnings, so likewise did management show traces of the time when a small number of persons, whose responsibilities were not too clearly defined, were in charge of the firm.

The planning period of special interest to us here was the period immediately preceding the actual construction of plant III. The situation was one where the " naturally grown " administration and its intricate system of responsibilities tried to reorganise itself, and faced the problems and muddle which are almost unavoidable before a new and effective organisation is to emerge.

Generally, staff requirements are established as follows:

a) the *Executive* formulates basic decisions concerning the future development of the enterprise;
b) the *business administration* and in particular the *sales department* offer suggestions as to what types of utensils should be produced;
c) these suggestions are examined by the *production department;* if they are feasible they are earmarked for production planning;
d) the *planning office* prepares the details of the production sequence and determines what personnel will be required;
e) the *personnel department* investigates the possibilities of finding the required personnel on the labour market.

The centre of preparation is the planning office, basing its work on established time and motion study or — with new products — an approximate estimate of the time required. The figures are submitted to the personnel department. They in turn calculate the given times, convert them into working days and estimate the staff required.

In view of the variety of the production programme and the complexity of the finished products, the calculation of target times and required personnel is a constant co-operative effort between planning office and production department, since they are best qualified to know the actual capacities of their workers.

In practice, there were difficulties between the various departments, due in no small measure to the lack of an organisational plan and a delineation of responsibilities in line with the size and nature of the enterprise and with the new situation on the labour market. In particular, the personnel department was not in a position to ensure sufficient regard for the viewpoint of personnel policy.

Plans to stimulate the manufacture of certain products came to nought because the required manpower was not available. This exposed the personnel department to the reproach that it frustrated essential technical and economic plans. The personnel department on its side tended to look upon the staff requirements proposed by the production department and the planning office as unrealistic and exaggerated.

The differences of opinion and divergencies in calculating personnel requirements at times reached major proportions, sometimes involving several hundreds of workers.

Moreover, there were questions of personalities, of great importance in view of the traditional structure of the administration.

The situation did not lend itself to the establishment of a systematic personnel policy when the preparations for reorganising the production process were initiated.

5. *The works council*

The works council representing the staff had, according to the staff rules, been informed and consulted when the decision was made to build plant III. However, on matters such as the transfer of a substantial part of the staff, or the thorough reorganisation of the entire finishing process, the works council was hardly considered. It was brought in only at a relatively later stage when ways and means had to be found to appeal to the workers, especially to the future staff of plant III. Compensatory and advantageous conditions, introduced mostly on the works council's initiative, were then incorporated into the plant agreement.

6. *First stages of reorganisation*

One of the most important benefits of rationalisation expected from the transfer of manufacture to plant III was the conversion to a more strict phase and flow of work. It became necessary therefore to plan in terms of comparatively long target periods.

By the end of 1963 the administration decided on a conversion plan according to which the finishing process of a part of the production would be carried out in plant III. At the end of June the first utensils should be ready to be shipped out. (The entire conversion was only to be accomplished by 1966 if not 1967.) Two months before the determined target date of plant III it was found necessary to postpone the envisaged dates by one month.

During the first half of 1964 the initial staff requirements were gradually introduced into plant III. The number of persons employed there rose from 39 in February, to 59 in March, 89 in April, 122 in May, 148 in June up to nearly 200 in July, i.e. shortly before the first products were scheduled to leave the plant.

The deadline for which planning was possible and within which the necessary personnel had to be obtained was therefore an extremely short one, particularly when one considers the necessary preparation in the technical and organisational field as well as the running-in period.

II. DETERMINING MANPOWER REQUIREMENTS

1. *Difficulties*

To investigate and tabulate manpower needs created considerable problems because of the complexity of the situation.

There was first of all a yearly replacement quota of 25 per cent which had to be met to keep the employment level at par. In addition, the plans for enlargement of capacity called for an increase in personnel, though, owing to rationalisation, this was not in proportion to the increase in output. Finally, extra employees were required to counter-balance the collective agreement on reducing the work week by 1 1/4 hours as from 1st January, 1964.

These requirements had to be met — at least partly — at a period when looking ahead was extremely difficult. During the installation of plant III the deadlines were set on a short-term basis and had to be modified. The seasonal sales fluctuations, which could only partly be offset by stocking, introduced another complication in estimating numbers.

The assessment of qualitative requirements was equally difficult. Without a thoroughgoing investigation it was impossible to forecast to what extent particular staff categories would leave, especially when certain new factors were bringing about an even greater increase in labour turnover, possibly affecting new categories of workers. Moreover, rationalisation and reorganisation would bring about a change in the structure of qualifications.

2. *The quantitative aspect*

As soon as the reorganisation and extension problems assumed a more definite shape, the responsible authorities (production department, planning office and personnel department) endeavoured to obtain an idea what size of staff the enterprise would require in future and at what ratio for the different plants. The various figures arrived at were then harmonised at coordination meetings.

It seemed desirable to improve the use of the new premises by introducing shift work to a much greater extent than before. This at least would offer some margin of flexibility in the direct ratio of desired output and the available personnel (on which agreement had not been reached even at a late stage in planning). It is significant that all the original targets were repeatedly amended as to maximum as well as minimum figures.

The logical next step, the determining of precise recruiting needs, was apparently not taken. If it proved necessary to harmonise production targets with available manpower, then this was apparently done on a short-term basis and because the lack of manpower was considered as a case of a " force majeur ".

3. *The qualitative aspect*

One of the aims of the planned reorganisation measures was the introduction of more rigid rationalisation of production and working procedures, by which it was hoped to reduce the present rather high proportion of skilled labour (60 per cent). It therefore seemed at first quite valid to neglect the qualitative aspect of staff requirements, particularly the number of skilled workers required in the various departments, as well as the individual aptitudes to be expected from non-skilled workers. As the proportion of skilled workers was too high — according to the probable argument — recruitment would be almost entirely concentrated on non-skilled workers who could quickly be trained, so that recruitment according to specifications would be superfluous.

Therefore, in the majority of cases, the initial calculations by the production department and planning office were of a quantitative rather than qualitative nature. In extreme cases, the personnel department just asked for a large group of " workers " without even specifying in what particular process of manufacture these persons would be placed. As far as any breakdown according to quality was attempted, this was done as a simple enumeration of required workers per job, without any specific details as to the degree of the desired qualification.

Disregard of the qualitative aspect caused considerable difficulties.

Even before the reorganisation it had become apparent that terminations threatened to create a gap within very specific vocational groups. One department reported a constant exodus of *centre lathe turners*, and the section foreman foresaw serious consequences if this trend could not be stopped or remedied by other measures.

The recruitment of foreign labour was also affected. The more discriminating among the foreigners, the Italians in particular, were in some cases not prepared to sign a work contract which did not tell them in advance what kind of work they were to do.

In reply it could be advanced that with such difficult labour market conditions, a firm with large recruitment requirements is practically forced to take on everyone it can. This argument is, however, incorrect, at least when there is vocational training in the plant, and when apprentices are being selected.

It seemed apparent that the opportunities provided by the apprenticeship scheme in the plant to cover long-term staff requirements were hardly taken into consideration when the reorganisation plans got underway. The apprentice workshop is of a relatively small size and had hardly been able to provide replacements for skilled workers even before the reorganisation. The head of the apprenticeship scheme was allowed very little say when the above plans were initiated. In one instance a whole group of young turners left the concern almost *en bloc* as soon as they passed their final exam because the company did not want to give them a firm commitment that they would be employed in future.

III. RECRUITMENT

Shortly before this investigation was made, the " launching crew " for the new plant III was recruited. The transfer of staff from the other plants at the same time as the transfer of the manufacture was considered but, at least in the beginning, workers had to be found, since plants I and II continued to manufacture until the first products left plant III.

1. *New recruitment for plant III*

By August 1964, plant III employed approximately 230 workers, more than two thirds of whom had been recruited externally. Only a good third of the newly employed workers in plant III are skilled, i.e. are currently doing the job for which they had been trained.

To recruit the " launching crew " for plant III, three sources were utilised:

a) Recruitment on the labour market for *German workers, particularly skilled workers.* Normal recruiting procedures were intensified. The employment office remained open outside working hours (including Saturday). Advertising was stepped up. By involving the regional branches, attempts were made to obtain labour from more distant areas.

b) *Foreign labour* represented the largest contingent of recruits for the initial phase of plant III, but it created a series of problems. Requisitioning foreign labour far enough in advance proved difficult, with the result that the personnel manager of plant III was obliged to undertake several journeys abroad, when the plant was just being started, so as to recruit foreigners 'on the spot'.

Such last minute measures were made necessary because deadlines became known only at very short notice, and because it was impossible to " stock up " with foreigners seeing that this entailed much more than the mere wages, e.g. they had to be housed and provided with interpreters. The training of foreign workers presented a particular problem. The living accommodation provided for them was naturally in the immediate vicinity of plant III. But during the starting stage proper training could only be given in plant I, which was 40 km away and which was already in the midst of transferring parts to plant III. Even when the training was accomplished these foreign workers could hardly compete with their German colleagues. Because of their lack of industrial experience and the difficulty of communication, these workers dit not easily fit into the highly organised flow line work. This in turn obliged the firm to substitute quantity (of workers) for quality.

c) The firm also had to recruit a proportionally large contingent of *women* — mostly for auxiliary and supplementary work — to a greater extent than is normally the custom in metal processing plants of this type. To recruit women in the neighbourhood of plant II was easier than to recruit men, since local manufacturing firms could only offer limited opportunities for the employment of women.

2. *Transfers from existing works to plant III*

The crux of personnel policy during the reorganisation period was the problem of transferring a large part of personnel from plants I and II to the new plant III. First of all, there were those who worked on *material* which itself was due to be transferred. Secondly there was the hope of being able to cut down on personnel in the older plants as a result of reorganisation.

As pointed out, in August 1964 only a third of the staff in plant III had originally worked in other plants of the concern. But this group would be joined by several hundreds of their colleagues by the end of 1964.

The entire staff concerned — approximately 470 workers — were asked to reply in writing to a questionnaire on whether they would:

a) agree to be transferred,
or *b*) under certain conditions only,
or *c*) would be totally opposed to a transfer.

71 persons were totally opposed to a transfer.

For the majority of employees such a transfer did indeed bring with it some serious disadvantages. If they were to maintain their present living accommodation, this would mean a longer trek to and from work plus a steep increase in transport costs. Even though there is a considerable amount of building activity in the locality of plant III, finding new living quarters there is not easy. In addition, the settlements in the vicinity of plant III are of rather rural character and many workers would not be prepared to give up the amenities of the city.

The employees' demand for full reimbursement of travel costs was turned down by the company, one of the reasons undoubtedly being that the firm hoped to encourage a change of living quarters, as well as to prevent the larger part of the staff from claiming such a travel allowance for an indefinite period.

But agreement was reached between employer's and employees' representatives on a " bridge-gap " allowance, intended to cover the additional costs of transport and meals. This allowance (of DM 2.50 per working day) was, however, only to be a temporary measure, for the duration of the resettlement and until the worker had found accommodation in the vicinity of plant III.

3. *Measures to make plant III attractive to staff*

The new buildings of plant III are spacious and well designed, air-conditioned and decorated according to the most recent colour-psychological findings. They contrast greatly with the narrow, often dark and badly laid out older plants.

At the end of 1963, the works council and the administration arrived at an agreement which contained two special concessions for the staff of plant III.

First, for the business year 1964-65 *profit-sharing premiums* would be distributed. The amount distributed depended on the declared dividends for the same business year, and the individual staff member's share would depend on the amount of work done and loyalty towards the firm (number of days worked, work consciousness, etc.). The only persons not benefiting from this scheme are head clerks, department heads and other assistants under special contract.

Secondly, arrangements were made for a special Xmas-bonus for all the staff who had been working for plant III before 30th September. Provided all other qualifying conditions were met, staff were to get 50 per cent of their gross monthly wages instead of the 30 per cent (or previously only 25 per cent) given in the other parts of the enterprise.

In addition, *initial wages* in plant III were slightly raised, and there was a promise of better housing. Deliberations to improve fringe benefits have also gone on for some time, although these concern the entire staff and not just plant III.

IV. LESSONS

In this reorganisation the " Personnel Sector " experienced an enormous pressure, coming on the one hand in the form of management directives and on the other from the position of the labour market. Thus the significance of this case seems to centre on the recognition that, in an extreme situation, the limitations imposed on conventional personnel policy, as practised in most industrial firms, show up particularly clearly.

Certain aspects of this are worth noting:

Greater consideration for the specific requirements of each individual post, and the specific qualifications, abilities and drawbacks of individuals selected to fill these posts, would have greatly facilitated the re-staffing (since those chosen to be transferred would have known what to expect). Such an attitude would have included the introduction of job descriptions of greater interest to the workers involved and would have possibly increased the number of applicants. Thus it seemed that the possibilities of introducing women to certain parts of manufacture could have been improved by designing specific jobs systematically.

To give qualitative considerations a higher priority would necessitate a closer co-operation between the personnel department and those responsible for the technical side of production.

In all the plans and deliberations the problem of a wage structure for plant III was hardly touched upon. It will be very difficult to correct the wage structure in view of the nearby sister plant of the company. Improvements in the salary scales might be found necessary to avoid discontent among transferred staff, but pay-concessions to them would probably result in chain-reaction wage demands.

A more active participation of the works council during the early planning stage of reorganisation might have been beneficial. This does not only apply to the works council's role of representing the staff's point of view. In addition it could have acted in an advisory, critical capacity and have drawn attention to the side-effects which at a later stage might cause dangerous situations. Thus, for example, it was only the works council which raised the problem of the future wage-structure in plant III.

With the labour market as it is today the question of quantitative and qualitative availabilities of labour becomes one of the classical factors of an enterprise's strategy, on a par with the sales market, the latest development in techniques, capital costs and disposable capital. Personnel planning has ceased to be a subordinate task which can easily be relegated to fall in with the " greater " needs.

Case IV

THE EFFECTS OF EXTERNAL FORCES ON STAFF PLANNING

I. Introduction

1. *History and structure of the works*

The foundry to which the rolling mills studied belong is outside the Ruhr area in semi-agricultural country. The town which gave it its name was founded only about twenty-five years ago as a result of the fusion of a large number of small villages; even today a considerable proportion of the urban district consists of land used for agricultural purposes.

The foundry was established in the thirties in green fields, in order to exploit the very extensive, though comparatively poor, iron-ore deposits in the area. Plant for extension could only partially be implemented by the end of the war. As a result of extensive dismantling and the fact that the partition of Germany deprived the foundry of the majority of its markets, the works were almost completely at a standstill after the war. When the decision was taken to start up again, the foundry was in a backward state compared with most other German foundries.

Bringing the foundry back into production was in many respects equivalent to rebuilding it. A start was made in 1954 with the smelting works. Shortly afterwards the first rolling mills came into action.

The structure of the works at the beginning of the sixties ensured their viability only under good economic conditions.

On the one hand, owing to the chronic shortage of capital, the burden of interest per ton of crude steel was more than double that of the Ruhr average, and on the other hand the production programme was endangered to a considerable extent by market fluctuations. In addition, experience had shown that crude and half-finished plates were the most susceptible to marketing difficulties and price fluctuations.

It was, therefore, essential that the works should extend their range of marketable rolling mill products, and above all ensure that as large a proportion as possible of their production should be offered in the form of finished goods. At the same time, however, it was necessary to exercise the greatest economy in order to carry through such a programme with the very limited resources available and without making excessive appeals to foreign capital.

A reorganisation programme which was decided upon in May 1960 provided for the building of three new continuous rolling mills: a wire drawing mill, a hot strip mill, a cold strip mill.

The wire drawing mill was produced jointly with another company and gave rise to special problems. The subject of this study, therefore, was the staff planning in connection with the organisation of the fine plate rolling mills, with the emphasis on the hot mill.

The building of the cold mill began in July 1961. The first preliminary trials took place in December 1962. Once the pickling plant had been installed in March 1963, normal operation could be undertaken, although on a limited one-shift basis. The hot rolling mill was started about one year later. The first preliminary runs took place at the beginning of 1964. At the time of the survey (July-August 1964), the stand was working normally on a limited one-shift basis. The number of workers employed in the two mills was over 800. The changeover to three-shift working was due to take place at the end of 1964.

2. *The labour market*

Shortly before the hot wide strip mill came into operation in 1962, owing to a deterioration in the situation on the steel market the works management found themselves obliged not to recruit any further labour and to consider dismissing a large number of existing workers (there was talk at the time of 2,000). While it is true that only a small proportion of the proposed dismissals were actually put into effect, the works found themselves confronted with a labour shortage at the time when the cold mill and the hot wide strip mill had to be manned.

The situation on the labour market had recently changed. Local reserves of labour were completely exhausted. The stream of refugees from Central Germany had practically ceased. As a result of the creation and reorganisation of processing industries in the same area, jobs were being offered which frequently provided better working conditions than those obtaining in the foundry. Moreover, owing to the collective nature of work in most branches of a foundry, foreign workers could only be used to a very limited extent.

3. *Organisation of the works management*

Like all other German foundries, the works under consideration are subject to the 1951 law on consultation. The Board of Directors, apart from one neutral member, consists of equal numbers of representatives of the workers and the shareholders. The Management Committee includes a Works Director who is responsible to the Committee for all problems in connection with personnel policy in the widest sense. The Works Council, composed of elected representatives of the workers, acts as a partner of the Management Committee and Works Director and, as a result of practically 100 per cent trade union membership, is in a particularly strong position.

The technical organisation of the works consists of 11 departments, 2 of which are of particular importance — the chief production department (3 steel production units and 2 rolling mills), and the chief machinery department (maintenance, operation and electric power). The remaining departments are either productive (coking works, blast furnace, power, water, etc.) or have the nature of a staff department (production planning, raw materials and fuel, testing department, etc.).

4. *Personnel management*

The Works Director's field of activities extends far beyond the conventional field of personnel management. The " labour management " department, for example, is concerned primarily with the tasks of job analysis and job evaluation, and output determination and evaluation.

The considerable importance attached to problems of work organisation and the application of scientific knowledge to the everyday life of the firm is due to a large extent to the Works Director's personal interests.

Within the works these interests are mainly reflected in the formation of a " labour science team ", consisting of the Works Director and members of his staff, which is an " idea factory " for determining basic principles of work organisation and staff planning.

II. STAFF PLANNING FOR THE NEW ROLLING MILLS

1. *The principles of staff planning*

In connection with the preparation for the organisation of the new rolling mills, the " labour science team " drew up a catalogue in which the main principles of " staff planning " are laid down. This catalogue contains an exposition of all the tasks involved in staff planning and lays down which department is primarily or secondarily responsible for the task in question. In particular it deals with:

a) requirements in staff and recruiting;
b) selection and engagement;
c) integration into the firm and the productive process;
d) care and control during the first few weeks.

It also stresses the importance of co-operation between departments, and in particular, co-operation between the departments dealing with personnel and the technical departments.

The function of staff planning is recognised as knowing in time " what is coming to us ". All those concerned deny that there was a fixed and detailed plan. It was rather a question of making continuous efforts to observe current developments systematically, to think out the next stages in advance, and to prepare solutions.

2. *Plans for assembling the staff*

Manpower organisation was dominated by the principle of beginning from the top. It took place in five stages:

a) *Selection and appointment of senior technicians*

About one year before building began on the cold mill, an engineer from one of the existing rolling mills was appointed manager of the new works; he was made responsible for most of the co-ordination of building and preparatory work. As quickly as possible he was supplied with individual department heads.

b) *Engagement of a " nucleus "*

While building work was still going on, a nucleus of workers for the new rolling mills, chiefly from workers already employed by the firm but also including a certain number of technicians brought in from outside, was appointed; these were mostly foremen and workers for key jobs in production and maintenance, together with a small number of white-collar workers for the foundry offices.

c) *Training of the " nucleus "*

The workers and office employees selected for the nucleus were first made fully acquainted with the new type of plant by means of visits and practical training in other works. Their training was completed by participation in the organisation of the new plant and, during the trial runs, in the individual departments of the plant.

d) *Engagement of a full crew for the first shfit*

During the trial runs the nucleus was completed to a full shift.

e) *Selection and engagement of workers to fill out the gaps in the second and third shifts*

The key jobs of the second and third shifts were mainly filled by workers who had already been employed on the initial shift, so that some of the new workers were required to replace them on the initial shift.

Whereas the first stages were predominantly carried out jointly for the mills as a whole, a difference was made between the cold mills and the hot mills in respect of the later stages. The last stage had been almost completed at the time of the survey in the cold mills, but was only about to begin in the hot mills.

3. *Training*

The stages in assembling staff resulted almost automatically from the technical programme, and the main problem was to train the different groups within the time limits available. The need for economy, and above all the exhausting of the firm's own reserves of labour, made it urgently necessary to shorten the periods of training. So far as could be ascertained, the works managed in most cases with a training period of between one and a half and two months. This was made possible by a concentration of training, and also by the fact that the medium and crude sheet rolling mills of the works were comparatively well off for workers with some relevant experience who could be transferred.

4. *Transition to three shifts*

On the cold mill, two-shift and three-shift operation was adopted a good year after limited one-shift normal operation had begun. The hot rolling mill was still working on a one-shift basis after about half a year of limited normal operation.

Apart from the difficulties of engaging new workers, which were greater in 1964 than in the previous year, the transition to full three-shift working on the hot rolling mill may well have been easier than for the cold mill. For reasons of economy, the first shift for the cold mill was not very much stronger than it would have been under normal circumstances, so that there were certain bottlenecks in respect of key workers when filling up the second and third shifts. By contrast, the initial shift for the hot mills was so fully manned that it was in a position to supply sufficient experienced workers for the second and third shift.

It is to be wondered whether the original plan for delaying transition to three-shift normal working is still reasonable. Certainly, a speeding-up may have been desirable in order to exploit the unexpectedly favourable market conditions for tin plate obtaining at the end of 1963. On the other hand, there are the increasing difficulties in meeting supplementary labour requirements which are connected with the general trend in the economy.

III. PROBLEMS OF RECRUITMENT

1. *General*

The building of the new plant gave rise to particular difficulties in the determination and satisfaction of manpower requirements. Some of the jobs had to be filled before they actually existed and before it was known exactly how production and working methods would work out. Even details of technical planning could not be final. During the initial period of the recruitment of key personnel and the nucleus, there was still uncertainty about the extent of electronic equipment and automatic control to be expected.

The works could only counter these uncertainties by using its existing staff as a recruiting reservoir for a flexible labour force of highly diverse skills, at least on a short-term basis.

2. *Determining requirements*

Senior workers had to be recruited at a time when no really detailed description of the details of the technical plant was available. In fact, the engineers to be recruited were themselves to co-operate in the organisation of the plant and work out the organisation for it. In addition, it was only possible to make an exact demarcation of responsibilities among the various managerial functions after the staff concerned had worked together. As they were appointed, the managerial structure of the new works took form, and the actual requirements became more clearly defined.

This procedure of almost simultaneous determination and fulfilling of requirements for senior staff was participated in to a considerable extent by the management and even to some extent by the board of directors. The personnel departments played no significant part during this phase.

The senior staff thus engaged was then to a large extent responsible for drawing up the general plans for the nucleus and supplementary workers.

The plant manning plan did not achieve a definitive form until the running in period. This may be explained by the fact that only when the nucleus staff spread out among the three shifts and took part in organisational and preliminary work, was the best use of each person demonstrated.

3. *Checking the demands of the technicians*

The labour management department, who nearly all had good technical training, had to see that the demands for staff made by technicians were justified. Objections against the general plans drawn up by the management had to be based on detailed information.

It should be mentioned that the recruiting committee, which discussed the necessary recruiting measures and engagements, also included representatives of the technical management who thus were aware of the attitude and difficulties of the personnel department.

It was necessary to check the qualitative as well as the quantitative demands made by the technicians, and in particular to counter the tendency of the technicians to overvalue requirements for the new jobs. One of the considerations in this connection was the maintenance of the wages structure throughout the works. The wages system is based on analytical job evaluation, so that any increase in the skills specified for a given job results in a correspondingly higher rate of earnings.

4. *Appointment of senior staff*

The provision of senior staff, and its subsequent use, was to a large extent a question of personalities. Transfers within the works have the advantage that the capabilities of the individuals concerned are known. But there are difficulties. It is difficult to cancel transfers of senior employees, particularly in cases where the transfers are accompanied by advancement.

Recruiting from outside sources is also a problematical business. Applicants expect financial and professional advancement which again is liable to produce rivalry between them and those who have been transferred from different branches in the existing works.

These difficulties were avoided as far as possible by the engagement of young engineers who had just completed training. Participation in the organisation of the plant provided them with supplementary practical training; and the prospect of growing up with the plant was undoubtedly an incentive.

5. *Proportions of transfers and new engagements*

So far as the remaining staff, technicians, foremen and workers, were concerned, the emphasis was on recruiting within the works as far as possible. This made selection and adaptation easier.

Moreover, the organisation of staff for the plant began during a period of acute marketing difficulties, which had caused the works management to impose a limitation on engagements and to dismiss a number of workers. Although the limitation on engagements was very soon lifted, it was nevertheless natural that the new jobs should be reserved for those already employed in the works.

The cold rolling mill began its run at the end of 1962, and the hot mill one year later. All the workers joining the cold mill in 1961 and earlier, and all those joining the hot mill in 1962 and earlier, were transferred from other departments of the works to the new plant. This also applied to all those joining the maintenance services before 1962.

During the construction of the cold rolling mill, the problem of getting replacements for the production workers transferred from other departments was apparently not very serious, since the works were trying to rid themselves of superfluous workers in any case. When it came to filling up the initial run shift, however, and above all the second and third shifts and the initial run of the hot rolling mill, the situation was quite different. By this time there was a shortage of labour in most branches of industry. The works was, however, able to fill vacancies for production workers by promotion from other departments for which replacements mainly consisted of unskilled labour.

Since key jobs were occupied by transferees, new engagements for the machinery and production departments of the new mills generally required no particular skills apart from general experience in industry and certain aptitudes, particularly of a sensory-motor nature.

The replacement of skilled workers who had been transferred from other plants to the maintenance sections of the new mills was more difficult. Here again it was possible to some extent to promote junior workers. Skilled workers can only rarely be obtained by direct engagements from the labour market, with the result that extra training is necessitated in the works' own training workshops. The situation was made worse in the first half of the sixties by a fall-off in the number of school leavers, resulting in reduced application for apprenticeships.

At the time of this study, the works undertook an extensive reorganisation of maintenance. As a result the ad hoc repair of used components of the plant was replaced by a systematic, preventive servicing according to which individual moving parts were replaced on a rotary system independently of their actual state. This resulted not only in a decrease in the number of workers employed on maintenance, but also in the possibility of transferring part of the duties to semi-skilled workers. This is reflected in the increasing use of women in the machinery and electrical departments.

6. *External recruitment*

At the same time as fresh requirements for completing the staff in the new works had to be satisfied, there occurred — as a result of the suspension of engagements and an increase in terminations — a general need for replacements well in excess of normal. The total number of vacancies was about 2,000 (whereas only a short time before there had been talk of the necessity of about 2,000 dismissals). 600 were required for the new factory, as well as 350 to replace those already transferred and 1,070 to compensate for natural wastage.

Three methods of recruitment were used:

a) Increased employment of foreign workers. In the summer of 1964, 187 foreigners were working on the production side of the cold rolling mill. The works took over a large group of foreign workers (including their housing) who had previously worked for a building firm in the same town.

b) The transfer of workers from other factories belonging to the firm whose requirements were falling off (particularly the iron ore mines of the company). Among the 275 new workers taken on and employed on the tin plate rolling mill in the summer of 1964, 89 had formerly worked in other factories belonging to the company.

c) Increased recruitment from the free labour market. Here it was realised that special measures would be necessary. Shortly before the survey, photographs of jobs with exact descriptions of working conditions and wages were published in press advertisements. A particularly intensive advertising campaign was concentrated on one particular job (crane driver). A recruiting office was opened in the Town Hall. All applicants were compensated for loss of wages in visiting the office, and those living in other localities were paid travelling and out-of-pocket expenses. Various financial incentives were used to facilitate the recruitment of new workers, for example, wage guarantees and the possibility of transferring seniority from a previous job.

At the same time, the works made an effort to reduce the requirements for new engagements by interviewing leavers to find out reasons for leaving, and also by a rationalisation of methods of work within the firm to ensure a better use of the labour available. In order to facilitate transfers within the works made necessary by rationalisation, workers who were transferred were guaranteed their previous wages.

IV. ADAPTATION

Out of the various groups of workers who had to be engaged or transferred during the construction of the new rolling mill, it was only possible to make further investigations in respect of two groups — the workers on skilled jobs who came from other factories of the concern, and the newly engaged workers for the initial shift and the second and third shifts.

1. *Transferees*

Selection for transfer had been made on the basis of an aptitude test, systematic personal assessments carried out within the works, and previous experience. Care was taken to obtain the agreement of workers selected for transfer.

The new plant gave promise of work which was less fatiguing than in most other factories of the firm, and the high rate of mechanisation gave it a considerable prestige. In addition, during the formation of the nucleus, there was a large percentage of highly skilled jobs available. Transfer, therefore, in many cases implied advancement and the prospects of correspondingly higher earnings. Nevertheless, there were certain hesitations about transferring. First of all, the workers were afraid of a " pig in the poke ". Unlike staff employees, most workers do not have a long-term career and advancement programme. For them security is more important than the non-guaranteed hope for advancement. Second, a comparatively high degree of skill was required for transfer to the key jobs. The workers qualified to apply, therefore, were mostly already in jobs where they were earning good wages. Lastly, applicants for transfer had to take into account that in the new factory they would first of all be employed on building and organisation work — i.e. tasks which are unpopular.

The factor which was eventually decisive in getting applicants for transfer was that exact and detailed guaranteed wages were agreed upon by the management and the works council. For all workers who had been receiving extra pay in respect of shift work, overtime and Sunday work on their previous job, a " lump sum in compensation " was introduced, which however, was not large enough to compensate for loss of wages in cases where no further extra pay for night work, overtime and Sunday work was received. In addition, the production bonuses for transferees were frozen at the level last reached in their previous job.

Apart from these transitional measures, the workers on the rolling mill had to be fitted into the general basic wages structure of the works. As a result of the modernness of the plant and in order to achieve acceptable relations with comparable jobs in other works, qualifications had to be made in the system of job evaluation, consisting of the introduction of new criteria and the revision of the relative importance of existing criteria.

2. *New workers*

Although the vacancies for new workers were in the less skilled jobs, they offered an interesting and comparatively well paid job, and a standing approaching that of a skilled worker.

The adaptation of these new workers did not give rise to any out-of-the-way problems. They were more prepared than the transferees to be content, at least at the beginning, with a subordinate position.

Nevertheless, there is an increasing difficulty in finding adequate labour for filling out the gaps in the second and third shifts. The opinion is frequently expressed that this difficulty can only be overcome by a more generous wage system. This problem will be particularly acute if it becomes necessary to speed up the transition to two and three shifts on the hot mills for economic reasons.

V. SUMMING UP

In the case under description it was necessary to improvise and seek last minute solutions, since it was impossible to lay down exact deadlines by which decisions on staff policy had to be made.

To a certain extent factors beyond the control of the concern made it impossible to forecast requirements. When the decision as to the construction of the new rolling mill was made, it was not possible to foresee either the recession of 1962-1963, nor the subsequent acute shortage of labour resulting from the rapid expansion of processing industries in the neighbouring region and from the building of the Berlin Wall and the drying up of the stream of refugees from the Soviet zone.

The plans worked out by the personnel management department were nevertheless a means of getting to know requirements quicker through co-ordination of the interests of the individual departments.

The importance of these measures became evident in various ways. The massive reduction of staff which was considered at the time of the acute deterioration in the market situation would have given rise to a catastrophic situation in the works a short time later. But the forecasts of labour requirements made clear the danger of further dismissals and the personnel department was able, on the basis of well founded arguments, to stop further dismissals and cancel the order prohibiting further intake.

The effectiveness of the planning was also evident in the organisation of the " nucleus ". The speedy integration of the first shift and the apparently slight difficulties during the run-in period speak for themselves.

But the effectiveness of the personnel planning was certainly limited by the need for improvising adaptations to urgent necessities as they arose. If personnel planning is to be fully effective, it must not be confined to the usual sphere of activities of the personnel department, but must be enlarged to cover the entire policy and strategy of the firm.

Chapter V

NORWAY

INTRODUCTION

The three Norwegian cases concern two private manufacturing firms and the Customs Service. Consolidations in operations were effected in the three cases, causing shifts in the location of plants or services and redundancies. Customs stations and centres were closed and wholesale changes were made in procedures and methods to overcome delays and secure greater efficiency. The overall result was an estimated cut in staff by almost one half over a period of some fourteen years. One of the private firms transferred the operations of one plant and concentrated production in a second plant far removed from the first. No additional staff was required in the enlarged unit. The second firm modernised its production processes by creating a larger unit and introducing new products in the plant from which the manufacturing of the first product had been carried on. Both were close together, so employee transfers could be arranged. The adjustment processes called for careful negotiations with employees and trade unions or staff associations on the principles and methods for selecting the redundant workers, arranging other benefits or solving problems following on the merger of the operations. The principle of seniority was the primary but not the sole guide in the selection of the redundant workers in the private plants. Natural wastage and new production were not sufficient to take up all redundant workers so that dismissals occurred in all three cases.

Mr. Johan Aamodt of the Norwegian Productivity Centre was charged by the Ministry of Labour with the conduct of the studies. They were made by a firm of business consultants in co-operation with the Productivity Centre. The field work and the preparation of the basic report was done by Mr. Johan Sagen who followed the " Guide for Case Analysis " provided by the OECD Social Affairs Division.

The initial planning for the technical and organisation changes was in all three cases conducted by the engineers or executives or, in the case of the Customs Service, the Rationalisation Department. The preparations were extensive and the schedule for installation was carefully developed. These same technical groups projected the manpower estimates. Personnel departments played little or no role in the work. The schedules for implementing the programme in the Customs Service and in Case I were adjusted to facilitate the placement of workers outside the enterprise. In Case I, the actual plant closing was delayed beyond the period of technical requirements to facilitate the employees' search for new employment. While the changes in the Customs Service consisted of many individual ones affecting different parts of a total organisation, the cases concerning the two private companies related to single major structural changes in the organisations.

The rationalisation programme for the Customs Service was experimental in the first period (1957-1960) so that manpower planning was on an ad hoc basis, but for the second period (1961-70) a precise staffing plan was projected. In all a reduction of 1,100 employees or 40 per cent of the staff was foreseen, with half occurring in each period. In Case I, a total of 18 workers out of 58 and 6 staff members out of 24 were finally released with the closing of the operation, whereas in Case II, 77 were finally affected by the transfer out of a work force of 257 persons.

Natural waste was a vital part of the programme of manpower adjustment in all three instances. The Customs Service stopped recruitment at the start of the programme, as did the organisation in Case II. Only after the transfers were effected, and the management believed that people with appropriate qualifications would have to be recruited from outside, was this instruction permitted to lapse.

Seniority was the prime determinant in deciding which workers would be redundant, although the two private companies allowed for exceptions for some departments to keep maintenance employees and to retain some special and older persons. The negotiations with the trade unions on the redundancy list were protracted in both cases. The management in Case I provided a long period of notice in order to allow people to find jobs outside, offered special facilities for advanced placement in other firms, and also paid one week's separation pay and provided for more protracted periods of benefits for those unable to find jobs. But all redundant employees were able to locate themselves within the first week. Financial assistance was also provided for the relocation of eight persons.

The management in Case II was, of course, able to offer jobs to many employees, so that finally 57 were transferred, 8 were retired, 3 left voluntarily and 8 were dismissed. One remained on the sick list. In the Customs Services, redundancy problems were minimised by encouraging people to move to new jobs in other areas and providing financial aid for this. Consideration was also given to the losses incurred in the sale of houses. The dismissal provisions in the Civil Service System were of course available to those who were released. Some took jobs in other organisations.

Neither of the two private companies undertook extensive retraining of employees. The transferred employees in Case II had a week's reorientation consisting in part of three days' formal schooling. The Customs Service had to reorganise its training materials, arrange discussions, conferences, meetings and visits by the Director, as well as exchange men between the Swedish and Norwegian Customs Services.

The Director of Customs had the most elaborate system of communication with the employees, using normal service channels and negotiating with the officials' organisations. In the private enterprises the shop stewards and trade unions were informed of the changes only after the decisions had been made. At times they challenged the decision on areas for closing or the transfer of departments and this produced lengthy discussions. The differences on the principles for selection of the redundancy lists also had to be agreed through negotiations, with the intervention in one case of the central employers' organisation and trade unions. In Case II, where the two plants were consolidated, a number of problems arose respecting this integration. Efforts at minimising differences and suspicions had to be handled and negotiated with the union.

Case I

CONCENTRATION OF PRODUCTION AND REDUNDANCY

I. Introduction

1. *The concern*

The concern which is to be studied here has its head office in Oslo with a factory (C) nearby. It also has a factory (A) in a big town in the western part of Norway, and a factory (B) in a town of average importance situated in the eastern part of the country. The concern has other factories, but they are of no interest in the present case.

The production of factory A was located in two buildings :

- Department 1, which manufactured production group 1 ;
- Department 2, which manufactured production group 2.

2. *The background of the changes*

With more liberal import regulations, the whole branch of this industry in Norway was placed in a very difficult competitive position. The market situation threatened to have a ruinous effect on Norwegian industry. Compared with other concerns abroad, the Norwegian production units were too small.

The possibility of reducing the costs by a reduction of the work force was considered, and early in 1959 an analysis was made of a possible concentration of production group 1.

3. *The technical changes*

It was decided to transfer the manufacture of production group 1 to factory B. Studies had shown that the production capacity of the original plant at factory B was too small to manage the entire production of production group 1. Machines and equipment were, therefore, to be transferred from factory A to factory B, where they would be placed in vacant buildings.

II. Manpower requirements

1. *The future needs of factory A*

Before the change there were 58 workers at factory A, one of whom was to be appointed a foreman. If department 1 was closed and the rest of the production maintained, 34 workers would be required, so that 24 men would become superfluous.

There were, in addition, 21 staff employees at factory A. If department

2 alone was to be maintained, the smallest number of these required would be 6 technical and 4 commercial employees, making 11 superfluous.

The total number of workers and staff economised by the technical changes would thus be 35.

2. *The future needs of factory B*

From the estimates of requirements at factory B it appeared that there was no need to increase manpower there. The machines which were transferred to this factory were of the same type as those already existing. There was thus no need to employ specially trained workers.

Studies of the production factors had already been undertaken at factory B for quite a long time. These formed the basis of an incentive system of wages based on a group bonus. When the equipment of factory A was transferred to factory B new studies were undertaken which were to form the basis for new agreements.

For dismantling and re-assembling the equipment the local work force was to be used.

3. *Practical difficulties*

When deciding which of the workers and employees would become redundant, the manager of factory A found himself faced with a number of conflicting interests:

a) as the concern already had a certain number of workers who were able to undertake the work of department 2, it would be beneficial if they could keep their positions, thus avoiding all the training problems;

b) as far as the maintenance workers were concerned, it would be financially wise to keep them, even if they would not be at work all the time;

c) it would be unfair if a man from department 1 was discharged, while a man with shorter service in department 2 stayed. Reactions were to be expected from the workers to all deviations from the principle of seniority;

d) in the case of some of the workers and staff employees, age and seniority would have such weight that it would be practically impossible to discharge them.

4. *Special cases*

In fact, the manager decided that 4 out of the original 24 redundant workers could not be discharged for " they are so old and have so many years of service that the factory cannot possibly discharge them ". For similar considerations it was decided that five of the redundant staff employees would remain in service.

The following arguments in favour of keeping the five staff employees were underlined:

1. the operating engineer had, after 10 years' service, such a thorough knowledge of the production that he was very precious to the company and should be transferred to factory B;

2. one man had 37 years of service in the concern and would reach the age limit in three years;
3. three men had 36, 36 and 28 years of service and it would be very unfair to discharge them. The man with 28 years of service was moreover in such poor health that he would hardly be able to find other work.

5. *Results*

The principle of seniority was not consistently followed. Maintenance workers, and workers from department 2, with less seniority were kept while workers from department 1 with longer service were discharged.

The actual manpower savings were 19 workers and 6 staff.

III. INFORMATION AND CONSULTATION

1. *Announcement of the change*

In May, 1960, the manager of factory A read out a communication to the representatives of the workers. This communication was the first information given to them. It informed them of the approximate number of workers to be discharged and explained the reasons why a concentration of production was necessary.

It also stated that in order to give employees a reasonable time to find other work the company would not put the restriction into effect before the spring of 1961, and that managers would be as obliging as possible to those who wanted to leave at very short notice.

This written communication was given to the representatives of the workers for further information among the workers and staff. The press and the district employment exchange were also informed.

During the period of investigation, the managers had conducted their proceedings in secret. They had been afraid that the workers would look for other work so early that the company might be obliged to cease its production sooner than it wanted to.

2. *Reactions of the workers*

The reactions of the workers came on two different occasions before the technical changes took place. The first was when the message was given to the workers in May 1960, and the second when the list of workers to be discharged was drawn up.

From the time of the first announcement it was evident that the workers did not accept the reasons for closing department 1. After the meeting the manager of the factory got in touch with the representatives of the workers in order to draw up a list of those to be discharged. This proved very difficult as the representatives of the workers stuck to the principle of seniority. A certain number of meetings were held but no agreement was reached. The differences of opinion developed into serious divergences between the representatives of the workers and the local manager.

In November 1960, that is six months after the first notice had been given, the report of the manager on those who must be discharged was produced. The company then witnessed a new blazing up of the difficulties.

The representatives of the workers were not willing simply to approve the deviations from the principle of seniority made by the local managers. The representatives moreover thought that the list contained too many names in comparison with the original promises. In addition to the dispute over the principle of selecting the workers to be discharged, conflict again broke out over the reasons for transferring the production to factory B.

The names of all the representatives were on the list of redundant workers.

3. *Controversy about the reasons for the change*

A meeting of the local workers' association at factory A decided to prepare a report which was to present the view of the workers on the closing of department 1. As a result, a special investigation was undertaken by the managers in order to refute the statements and arguments contained in the report, and in February 1961 a meeting was held between the representatives of the workers, the trade union, and the Norwegian Employers' Association. At this meeting the managers gave more detailed information about the reasons for the transfer of production which had obviously not been fully understood before.

4. *Controversy about which workers were to be discharged*

The manager's list of redundant employees was not published until November 1960. Because of the departure from the principle of seniority, and the fact that the list was said to be longer than the administrative manager had originally promised, the representatives of the workers informed the managers that they wanted to submit the matter to their union. The local managers pointed out that, in view of the future work at department 2 and the maintenance of the factory, deviations from the seniority principle were necessary.

In December 1960 a meeting was held to deal with the dispute. Representatives of the workers' trade union took part as well as the Norwegian Employers' Association and representatives of the company and the workers. The company representative agreed to reduce the list by one man so that only 18 men were finally discharged together with an apprentice who was to leave when his apprenticeship was over. They also gave their detailed reasons for not following the principle of seniority in each individual case.

5. *Newspaper items*

In March 1961, in an article in the most important newspaper of the town, the management made a statement about the discharges. This item lead to an article in the same newspaper a week later, written by the president of the workmen's association. These articles revealed the divergences between the two.

IV. OTHER ASPECTS OF PERSONNEL POLICY

1. *General principles*

The chief engineer was the manager of the staff department and he made a survey of the regulations, laws and agreements that had to be considered. These covered:

a) term of notice according to Section 41 of the Labour Protection Acts;
b) discharge of sick workers according to Section 44 of the Labour Protection Acts;
c) notice to quit according to the Labour Act, Section 30;
d) meeting with the representatives of the workers according to the collective agreement.

The chief engineer was responsible for seeing that the company complied with these regulations when undertaking the changes. He was furthermore charged with supervising the procedures so that they could be carried through with a minimum of disruptive effects.

2. *Timing of discharges*

The managers had at an early stage underlined that employees must be informed of the changes as early as possible in order to have time to find other work. One year was thought to be a suitable interval. The time of the announcement was therefore to be as favourable as possible for the workers.

Because of this, the actual changes took place later than would have been necessary for purely technical reasons. The time of the discharges — and the ceasing of production — was fixed for 31st May, 1961, as it was known from experience that the labour market would then be favourable. If the discharged employees did not get permanent work at once, they could at least get temporary jobs as substitutes during the summer holidays.

General notification of manpower reductions had been issued in May 1960, and the list of workers affected in November. Actual notice of termination was given in April 1961.

3. *Financial help to the discharged workers*

The following proposals on financial help were approved by the managers.

The help was to be given on the understanding that the person benefiting from it should report personally to the employment exchange at least twice a week to look for new work. During the first week after discharge, the unemployed would receive a week's wages corresponding to the average of the wages received during the four preceding weeks. After that the amount of money to be paid would be calculated as a certain percentage of these wages, the percentage to vary according to the different classes of income tax. The allowance would probably be paid for 15 weeks. Unemployment insurance would be deducted from these sums, and the allowance would cease when the employment exchange found new work for the beneficiary. If the situation on the working-market in the district were to deteriorate after the discharges, a continuation of the payment for some time would be considered.

In fact, a week's wages were paid to all those who had to leave, but no financial help was given after that as all the workers found other jobs so quickly that they did not need the help.

4. *New jobs or the discharged workers*

With the help of the local employment exchange the company tried to find new jobs for the workers who had to be discharged. The employment exchange had been in touch with a firm R which was interested in taking over 13 of the workers.

In February 1961 the manager of factory A was asked if the workers could leave at once. The answer was the company would go as far as possible, but it was emphasized that department 1 was to continue its running until the month of May.

It was eventually agreed that the workers should be transferred by groups, and six men were asked to report to the employment exchange for the first turn. The others were to receive letters later. Only four men out of the six appeared and only three turned up at firm R. Finally only one man wished to be employed by the firm R. He was able to leave at once.

The managers of firm R were disappointed at the result and the project was abandoned.

5. *Financial help to transferred workers*

Eight employees were transferred to a new department of the same company.

The company had drawn up proposals covering the financial aspects of transfers. When a worker was transferred from one factory to another the transportation costs were to be paid according to the bill. Moreover, a month's wages were to be paid to cover the extra costs caused by the transfer.

These principles were applied to two officers who had to move to other cities. In addition, one of them, the cashier and disburser of wages who was transferred to factory C, received a higher salary. This increase was meant to cover the higher costs of living after the transfer.

Case II

CONCENTRATION OF PRODUCTION AND TRANSFER OF EMPLOYEES

I. INTRODUCTION

1. *The company*

The company has its head office in Oslo and consists of a number of productive units. This report concerns three factories (A, B and C) situated in Eastern Norway.

The three factories are in different localities and each has a fully developed mechanical plant with the necessary subsidiary departments and administrative services. The products manufactured in factories A and B belong essentially to the same group (product group 1).

All the company's activities are managed centrally from the head office in Oslo. The managing director, assisted by a sales manager and a technical manager, is responsible for day-to-day management.

In addition, the head office consists of the four departments:

a) the purchasing department;
b) the marketing department carries out all work connected with domestic sales and exports;
c) the technical department is responsible for co-ordination, analysis and supervision in technical and technical-economic matters connected with the operation and development of the company;
d) the finance department keeps the financial and business accounts for the entire company.

The factory management in factory B consists of — the factory manager, a production engineer and an office manager.

The factory management in factory A consists of — the factory manager, two chief engineers and an office manager.

2. *Background to change*

Technical development had brought with it obvious advantages in the use of large production units as far as the manufacture of product group 1 was concerned. This was a trend which the management of the company expected to continue. For that reason it was realised that the cost structure under which the company was operating would become increasingly unsuitable as new technical advances made it possible to exploit the benefits of large-scale operation. The structure of the company would have to be rationalised so that the company could make full use of the technical advances and thereby increase its surplus and compete successfully.

3. *The technical changes*

Broadly, the changeover consisted of concentrating in one plant — factory A — the production of product group 1, manufactured by factories A and B. This meant that the personnel of factory B were freed for other duties, and for this reason the company started the manufacture of products belonging to groups which from now on we shall call product groups 2 and 3. The composition of these groups is rather heterogeneous but they may nevertheless be treated as two units.

Product group 1 consisted of products 1(a) and 1(b). For technical reasons it was decided to concentrate production in two stages. The first stage concerned products 1(b), and the second concerned products 1(a).

4. *Planning of technical changes*

a) *The rationalisation committee*

In June 1955 the company had appointed a rationalisation committee to enable it to make better use of the new technical opportunities. This committee originally consisted of one chief engineer from head office, one engineer from factory A and two engineers from factory B. Some changes were made in the composition of the committee as its work progressed, but throughout its activities all members were engineers. There was evidently a struggle between the managements of factory A and factory B to secure the concentrated factory, and head office had to take this into consideration in the composition of the committee, on which each factory eventually had three members.

The idea of concentrating production of product group 1 emerged as a result of the committee's work. The detailed plans for the transfer of production to factory A were prepared by an *ad hoc* working committee made up of members of the rationalisation committee.

In planning the technical changes the committee was faced with the problem of suitable technical equipment. There were alternative solutions, such as developing some of the equipment within the company, purchasing ready-made equipment from outside and making such adaptations as were necessary, or merely carrying out improvements in plant that already existed. In actual fact use was found for all of these solutions.

Broadly speaking, the company relied on familiar machine-types, and the new machines were typical high-capacity machines. The delivery time for some machines was inclined to be very long. Part of the preparatory work consisted in deciding how soon it was technically possible to accelerate rationalisation.

b) *The committee on new products*

The company already had a standing committee — the committee on new products — whose function was to discover new products that might lend themselves to production in the company's factories. In August 1958 a special working committee was set up whose function was to examine the problem of finding alternative production for factory B. This was done in two ways. In the first place inquiries were made outside the company. In the second place the company's technical departments carried out research on new products that might lend themselves to production in factory B. A very large number of suggestions were received. In appraising them the committee set out to discover projects which would, in the first place, create a large number of new jobs and, at the same time, not require large investments.

The result of the external inquiries was a decision by the board of directors that production should begin in accordance with two of the proposals submitted. These products belong to product group 2.

The other method adopted, that of discovering suitable products in the company's own departments, also showed results. Factory C needed to expand and a decision was taken to decentralise production in such a way that the necessary extensions could be effected by transferring to factory B the manufacture of products previously confined to factory C. In addition, a number of new products of a similar nature were found and the manufacture of these was also entrusted to factory B. These products have been designated product group 3.

c) *General administration*

The managing director himself took a very active part in the changeover, interesting himself in the work of the rationalisation committee and in that of the committee on new products.

The final decision was taken by the board of directors on the basis of recommendations made by the working groups. When the analysis phase was over and the implementation phase began, the management of each factory was put in charge of implementation, but this was co-ordinated by head office. Head office also provided technical assistance wherever necessary.

II. APPRAISAL OF NEW MANPOWER REQUIREMENTS

1. *Choice of factory*

The first estimates of the consequences of concentration contained two alternatives. One was concentration in factory A, and the other was concentration in factory B.

The consequences of choosing the latter alternative would be that factory B would employ 445 persons, including 55 supervisory personnel. Factory A would be left with a total labour force of 100 persons, including 13 supervisory personnel.

If factory A were chosen for concentration, the total labour force in the two factories would be exactly the same, but factory B would employ 122 persons, including 12 supervisory personnel, and factory A would employ 423 persons, including 56 supervisory personnel.

Surplus manpower would cause the greatest problems in factory B, since the natural rate of termination was lowest in that factory and at the same time the prospects of alternative employment were less favourable in that area than in the neighbourhood of factory A. Building conditions, the price of land, ground conditions, and the possibilities of rational internal transport were also decisive factors, showing that factory A was better suited for concentrated production.

Due to the fact that the two factories were situated so close to each other, it was thought that a transfer of workers from one to the other was practicable.

2. *Methods of calculating*

The methods used in calculating the labour force in the centralised factory were based on empirical figures possessed by the company for the labour force on comparable existing mechanical equipment. Thorough time-studies of the various jobs had not been made in connection with the switch to high-capacity machines on which the change was based, but an estimate had been made of what the new machine units were expected to involve in the way of manual operations, and a rough estimate of the time required was made on this basis. Nor was there any interest in a method involving precise calculations, since care would be taken for capacity reasons to ensure that the various departments would not be understaffed if the volume of production had to be increased owing to prospective export contracts.

3. *Estimated redundancies and transfers*

It was considered advisable to carry out the concentration of production in stages, and 20 persons were expected to become redundant initially, on the transfer of products 1(b).

In the second stage, which concerned products 1(a), first estimates showed a manpower surplus of 171 persons, 28 of whom would retire on pension within five years. This would leave a net surplus of 143 persons, made up of 90 female operatives, 37 male operatives and 16 supervisory personnel.

The 90 women constituted the largest item in the analysis of redundant personnel. The committee felt, however, that this figure could not be considered high since it was equivalent to a termination of nine women per factory per annum over a period of five years. By way of comparison, the committee pointed out that in 1956 in factory A alone 23 women had terminated their contracts.

The corresponding figure for men was 37, which was equivalent to an average annual termination of eight persons in all over a period of five years.

Besides a reduction in the labour force, concentration would also involve the transfer of workers from one factory to the other. Concentration in factory A would entail the transfer of about 100 persons from factory B. This did not constitute a serious problem since factories A and B could be considered one geographical sector. During a transitional period, workers could be conveyed by bus from one factory to the other, the total travelling time per day being approximately one hour.

4. *Principles governing redundancy and transfer*

The committee expressed the view that the two factories should be treated as one for the purpose of seniority. Owing to the existing age distribution, this would mean that the workers in factory B would normally displace workers in factory A, with a shorter period of service.

The problem of redundancy would be slightly eased by confining all the reductions necessary under the first stage to factory B, since this would avoid the transfer of factory B workers with a short period of service who would in any case lose their jobs in the second stage.

It was also considered natural to make a distinction between:

a) skilled workers, and
b) unskilled workers.

Within each of these two categories it would be possible to make a further sub-division according to the qualifications demanded for each particular job.

After reduction, the labour force in both factories would need to have the correct composition of unskilled workers and of the various groups of skilled workers. A balanced age distribution was also desirable in each factory, but was not likely to be achieved if the seniority rule were applied strictly.

The employability of the labour force would depend on vocational training and age, and to a certain extent on a number of other factors as well. In the type of production under review, inadequate physical fitness could cause difficulties in the event of transfer. It might be difficult to retain persons who claimed that they were physically unsuited for work on a particular product.

5. *Preparation of lists*

The committee felt that it would be useful to prepare lists of employees who were to be transferred and of employees who would become redundant, and to have these lists accepted by the trade union. These lists could also be used for the purpose of central placement within the company.

With this in mind the committee felt that no new personnel should be recruited until it had been ascertained whether any of the persons on the lists could be employed. In fact, partly because of natural wastage, and partly because of an increase in the production of another product, it proved necessary to engage new personnel. These were employed on a temporary basis and each person was informed of the company's concentration plans and how he or she would be affected.

The lists referred to above were prepared and contained the following particulars:

a) personnel redundant owing to concentration;
b) exceptions from seniority rule;
c) B workers transferred to A on account of concentration;
d) particulars of workers who were to be retained in B, who should, under the seniority rule, have been transferred to A (workers engaged in the production of a product requiring a high level of physical fitness).

Supervisory personnel were excluded from the normal estimates of redundant personnel.

The average age after concentration was expected to be 43 in factory A, and 53 in factory B. It was felt that the average age in factory B could probably be considered very high, but not so high as to warrant a departure from the seniority rule.

6. *Time-table*

The committee's draft time-table for the completion of the first stage of concentration, which concerned products 1(b), provided for two phases, which were determined by technical considerations: the 1st phase would be completed in August-September 1958 and the 2nd phase would be completed in January 1959. The number of workers to become redundant in the first phase was 20.

The committee believed it would be technically possible to complete the second stage of concentration, affecting products 1(a), in about two years. The factors governing the time-table were the building of a new factory to manufacture a raw material which was used in production, and the building of factory premises for the installation of additional machine units.

After the completion of the final phase of the changeover, approximately 150 workers would remain in factory B plus a certain number of supervisory personnel. Factory A would take 76 workers from factory B.

7. *Final arrangements*

Head office prepared a plan of action for completing the final stage of the concentration. This plan was discussed at a meeting attended by the managements of the two factories concerned and a chief engineer from head office. Arguments put forward at this meeting made it necessary to revise the plan of action. The essential difference between the head office plan and that recommended at the meeting was that head office had wished the immediate dismissal of the temporary employees in factory A. One of the reasons why this could not be recommended was that there had been unrest in the factories and it seemed possible that an abnormally high termination frequency might be expected on the part of the workers.

III. INFORMATION AND CONSULTATION

1. *General*

Information meetings were held in the two factories. In factory B the information was given by the managing director in person. In factory A the managing director was represented by a chief engineer from head office. An assurance was given by the management that the workers transferred to factory A would travel between factory B and factory A at the company's expense.

The meeting with the workers resulted in a written inquiry from the trade union in factory A, asking for a more detailed statement on the questions discussed at that meeting.

A written statement was given in a letter sent to the trade union concerned. It included the following points:

1. The management trusted it would not be necessary to transfer any more workers from B to A over and above those needed in connection with the concentration.
2. In its employment policy the management would naturally do its utmost to prevent workers being transferred to and fro between factories.
3. The company was not bound by any agreement respecting seniority, but obviously conformed to certain rules in its personnel policy. If a decision were based on seniority, this would be reckoned from the date of each worker's recruitment to the company (not from the date of a worker's recruitment to a particular factory).

Concurrently with the written information given by the company to the trade union, the workers concerned received a letter from the company explaining the situation and asking for a reply within a specified period as to whether they accepted employment in factory A or not. It was also stated that those who did not avail themselves of this opportunity should consider their employment terminated as from 22nd February, 1962.

The shop stewards were also notified that the company was going to dismiss temporary employees and that some of the dismissal notices were going out immediately.

2. *Redundancy problems*

The local trade unions differed as to the meaning of the term " seniority ".

The trade union in factory B maintained that seniority in *the company* should be the basis for selection of redundant personnel. The trade union in factory A maintained, on the other hand, that seniority should be calculated separately for each factory.

When it became necessary to dismiss or transfer employees from factory B, the local trade union expressed the view that in cases where a man and his wife were both employed in the company the wife should be dismissed. The union also thought that in cases where, for instance, the husband was in receipt of a pension and the wife was employed in the company, the wife should be dismissed, and that widows who were in receipt of a widow's pension and who were also employed by the company should be dismissed. The union thought that in this way it would be possible to provide employment for bread-winners who would otherwise lose their jobs.

The personnel department in factory B investigated the matter. It was found that 16 women would be in danger of dismissal if the company acted upon the union's recommendation.

The management decided against accepting the views of the trade union If it had accepted them it would have been guilty of a further departure from the principle of seniority.

3. *Transfer problems*

After the employees transferred from factory B had started work in factory A a certain amount of friction developed between them and the workers already employed there. This led to a meeting between the management and the workers' representatives.

The latter stated that they had noted with growing concern that transport jobs and other " open-air jobs " were being given to workers transferred from factory B. They also had a definite impression that the transferred workers escaped the particularly " hard " department (a department in which, owing to the nature of the product manufactured, workers were under considerable physical strain) more easily than had formerly been the practice in factory A. This now meant that A workers, some of whom had long service, had to take on jobs from which transferred workers were exempt.

The workers' representatives had previously pointed out that the workers from factory B should take the jobs which were vacant in factory A. They now made it clear that if there was to be a large-scale reshuffling of the labour force to make room for factory B workers who wanted jobs other than those which were vacant, the trade union of factory A would have to review its attitude to the seniority question.

The representatives of the company emphasised that the transferred workers had the same rights and obligations as the other workers in the factory. All workers were bound to accept the work assigned to them. The company could give no undertaking that it would not re-allocate factory A workers. It had endeavoured to complete the transfer of workers from factory B without a large-scale reshuffling of the labour force.

IV. IMPLEMENTING THE PROPOSALS

1. *First stage of concentration*

Manufacture of new products (group 2 and 3) began in factory A in 1959. Consequently, when products 1(b) were transferred to factory B during 1959, no reduction in the labour force was necessary.

2. *Second stage of concentration*

Under the final plan the labour force in factory B, which at 1st January, 1962, consisted of 257 persons (exclusive of part-time workers), was to have been reduced by 77 when production was transferred from B to A. It was possible to offer the great majority of these persons employment in A, some would retire on pension on attaining pensionable age during the year, and a number of older workers would be offered a pension before attaining pensionable age.

The transfer of workers from B to A began on 1st March, 1962, and was carried out in five stages during March. Day workers travelled by service bus and shift workers by hired bus. Two of the workers transferred obtained an extended licence for bus-driving and drove the others to work in the hired bus.

After the changes the figures for the reduction of the labour force were as follows:

	MEN	WOMEN
Total transferred to A	50	7
Normal retirement on pension 1962	5	1
Early retirement on pension, at 30th June, 1962	2	–
Dismissed owing to production cuts Jan.-March	7	1
Voluntary termination of employment	3	–
1 worker on sick leave who did not reply	1	–
Total reduction of labour force in 1962	68	9
	77 persons	

3. *Methods used in selection of redundant personnel*

In the selection of redundant personnel the seniority principle was applied. Exceptions were made for one person on occupational grounds, and five persons on hardship grounds in that they would have found it difficult to get work elsewhere.

The management took the view with regard to the question of seniority that the basis to be used in the selection of redundant personnel should be seniority in the company (factories A and B being treated alike for this purpose).

4. *Further adjustments*

As has already been stated, the workers who were transferred from factory B could not all be placed in the vacancies immediately available at factory A, and some reshuffling of labour was necessary:

a) For reasons connected with transport some transferred workers were unable to participate in a three-shift system.

b) A fairly substantial number of the transferred workers were physically unable to do the work in one department.

By April 1962 new recruitment needs of factory A were assessed at 19 men and 10 women. Factory A asked that these requirements be met by transfers from factory B or that permission be given to recruit new personnel. The result was that factory A was allowed to recruit from outside the 10 women and 8 men required (11 women replaced for workers who had terminated their employment).

The reason for this decision was that now, after concentration, it was necessary to assume that the two factories would be able to deal with their manpower problems independently of each other. It would only further aggravate an already difficult situation with regard to age distribution in the two factories if these were not allowed to recruit from outside young workers who could be easily mobile in all departments of the factories. There were also the difficulties over workers who could not be employed on a certain product for health reasons.

5. *Wages and salaries*

As a very general conclusion respecting the resultant changes in remuneration, etc., it can be stated that no worker's remuneration prospects were better or worse after transfer from factory B to factory A.

In cases where workers transferred from product group 1 to product groups 2 and 3 the same was true, particularly as a large proportion of the work on the various products was piecework.

6. *Methods used in training the workers*

A week before the workers were transferred from B to A a written programme was made available to those who were to be transferred.

The training programme was very detailed and aimed at making each worker fully conversant with the production process and the machine units. There were teachers for both the theoretical and practical subjects. The persons who usually initiated new employees to work in the factory acted as teachers.

After three days of classroom training the workers were assigned to their future workplaces.

For the first week of the workers' participation in normal work, the factory had extra personnel available to assist departments in which there was a drop in production.

Case III

RATIONALISATION OF THE NORWEGIAN CUSTOMS SERVICE

I. INTRODUCTION

1. *The Customs Service*

The main functions of the Customs Service are:

a) Assessing and collecting customs duty and special charges.
b) Controlling imports and exports (which includes enforcing import and export prohibitions, licensing provisions, veterinary provisions, health regulations, provisions as to origin under the EFTA agreement, etc.).
c) Supervising the submission of statistical returns of imports and exports, etc., to the Central Statistical Bureau.

For administrative purposes the Customs Service is divided into:

i) the central management in the Directorate of Customs.
ii) the local administration in customs centres, customs stations, customs posts, etc.

With effect from 1st July, 1957 the central management of the Customs Service was made an autonomous Directorate of Customs outside the Ministry of Finance and Customs. This new arrangement was a very radical break with the past. For more than 600 years the central management of customs had been located in the government offices.

The local administration consisted of 10 customs districts, with 60 customs centres and 125 customs stations and customs posts, when the Directorate of Customs was set up. At that time 2,600 persons were employed in permanent and temporary posts. There were 469 temporary posts. The customs centres, customs stations and customs posts were established at strategical points along the coast and the land frontiers.

The customs operations (which are carried out by the local administration) may, as regards the work involved, be divided into three groups:

a) inspection duties;
b) goods-handling duties;
c) accounting and financial operations.

2. *Background to rationalisation*

For many years the situation in the Customs Service had been very difficult. Complaints were always being received from industry and traders about delays, complicated formalities and expense. Members of the Storting sharply criticised the Customs Service and called for improvements.

During the debate in the Storting on the reorganisation of the central management of the Customs Service (13th December, 1956) conditions in the Customs were described by many speakers, including a member for Oslo who said:

> " The conditions in Oslo are such that people wait, not five to seven hours, or 14 hours, or 20 hours, but anything from 14 days to three weeks to have their goods cleared by the customs. These conditions are unparallelled in the western world, as far as I know. "

The reason for the reorganisation of the central management of the Customs Service was that the Service had not moved with the times. The Government and the Storting believed that an autonomous directorate was better qualified to effect the necessary renovation than a ministerial department.

3. *Planning the technical changes*

There were two ways of improving conditions in the Customs Service — by increasing the personnel or by bringing about a large-scale and very radical simplification both of the local administration and of the established work routines and working methods. The second of these was chosen.

This rationalisation had been going on continuously since the Directorate of Customs was set up on 1st July, 1957. It has been concentrated within the following sectors:

a) Reorganisation of the central administration.
b) Rationalisation of the Service's working methods and work routines:
  i) Adjustment of the Service's hours of loading and unloading to the port hours of loading and unloading in order to reduce overtime.
  ii) Reduction of duty-crews from two men to one man.
  iii) Extension of the voluntary declaration system.
  iv) Division of the work into internal duties (mainly inspection) and external duties (mainly goods-handling).
c) Reorganisation of local administration: Closing of customs centres, customs stations and customs posts; grouping of customs centres in larger administrative units; changeover from stationary to mobile guard duties.
d) Amalgamation of customs centres in Oslo.
e) Co-operation between Norwegian and Swedish customs stations.
f) Various other rationalisation measures, including the simplificaton of working methods used in customs centres.

The first plans to be prepared covered the years 1957-1960. A new rationalisation plan covers the years 1961-1970. Although the plans are divided into two periods, the work of rationalisation has gone on without interruption.

The changes already made in the Customs Service include some very radical breaks with the past. To a certain extent they were introduced on an experimental basis in a few selected customs centres. When experience had been gained and it was seen that changes would be beneficial it was decided to extend them to the entire service.

The changes in the Customs Service have not resulted in substantial expenditure on investments. On the contrary, the Service has been able to close a number of customs stations, customs warehouses, etc.

Quite a few of the changes were modelled on the practice in other countries.

II. APPRAISAL OF NEW MANPOWER REQUIREMENTS

The primary objective of rationalisation was a faster, more effective and more economical handling of goods. It is too early yet to make an overall appraisal of future manpower requirements. The many different ways in which rationalisation could be brought about made estimates of future manpower requirements uncertain.

The Directorate of Customs decided that in the first period of rationalisation it would appraise each measure and how it affected the manpower requirements of each customs centre and of the country as a whole. In the case of the last period, an overall staffing plan has also been prepared in which an appraisal has been made of the probable reduction of personnel in the service and of the measures that can be introduced in conjunction with this reduction.

1. *Methods, procedures and estimates*

It has not been possible within the bounds of this inquiry to undertake a thorough appraisal of all proposals and changes. The selection given below does, however, represent the most important changes.

a) *Investigation of each customs centre or customs station*

In the investigations an attempt was made to express quantitatively the volume of goods or the traffic involved at each customs centre, customs station or customs post.

The purpose of the investigations was to determine whether a particular customs centre, customs station or customs post was needed, or whether it was possible to redirect the traffic or carry out the customs operations in some other way. Several of the customs centres and customs stations belonging to the Customs Service had been established a very long time ago and at a time when the traffic conditions were quite different. Due to the use of new means of transport and new transport routes, the traffic basis had changed considerably since the time when the various customs centres were established.

The investigations also concerned the manpower needs for carrying out the work that would accrue in the future.

The starting point was the existing arrangement of duties at the customs centre. The clerical duties were appraised. The office of the district manager, the goods-handling office, the office for inward and outward operations, the office of the customs cashier, the duties performed by the duty-crews, customs examination at the customs centre, the goods-handling service and the external service were investigated.

On the basis of accurately recorded routines and particulars of the volume of work, an appraisal was made of each sub-department, and draft changes were prepared. Lastly a staffing plan was prepared for the customs centre and proposals were made for the abolition of posts.

The procedure outlined here was that adopted for a customs centre in Western Norway.

The investigation at that customs centre was carried out by a consultant from the rationalisation office of the Directorate of Customs. The consultant carried out his work independently, but the officials' organisations were represented by one of their officers when the centre was visited.

Similar analyses were carried out for other customs centres. No aggregate figures are available for the whole country of the number of persons who would become redundant as a result of these particular investigations. One reason for this was that the Directorate of Customs did not intend to make economies until natural wastage made them possible.

The analyses were important for each customs centre investigated, since the staffing plan that was prepared served as a target for a future organisation plan for the centre.

b) *Frontier customs stations*

The customs co-operation introduced along the Swedish-Norwegian border resulted in the closure of a number of stations. In the period between July 1957 and October 1963, 33 customs stations out of a total of 45 were closed, as well as all the 23 customs posts.

Between July 1957 and January 1965 the number of manned Norwegian administrative units along the border decreased by *approximately 78 per cent*, and the number of officials by 118.

The volume of work of the remaining customs stations would have increased if the routines for customs handling and inspection duties had not also been altered.

c) *Larger administrative units*

The Directorate of Customs expected that, as a result of the reorganisation of administration, fewer officials would be employed for administrative purposes, and that the full implementation of the plan would lead to an economy of approximately 70 officials.

The grouping of the customs centres in larger administrative units permitted a flexible re-allocation of personnel among the customs centres in the customs district. After the change this resulted in considerable economies.

Due to the amalgamation of the Oslo Marine Customs Centre and the Oslo Railway Customs Centre, the personnel was reduced by approximately 200 officials between July 1959 and January 1961.

d) *Closing of customs centres, customs stations and customs posts*

The following changes took place in the Customs Service's first rationalisation period.

In July 1957, there were 102 customs stations and 23 customs posts in all. By January 1959, 51 customs stations and 15 customs posts had been closed and 2 customs stations had been converted to customs posts. These figures include customs stations and customs posts along the Swedish-Norwegian border.

In the rationalisation plan for 1961-1970 it was proposed to close a number of customs centres owing to the small amount of traffic at each. On the full implementation of the proposed closures, 14 customs centres would be abolished and 10 more would be converted to customs stations.

e) *The declaration system*

In introducing the voluntary declaration system the Directorate of Customs expected a considerable increase in the number of examinations at each examination unit. In addition the hours of business would be used more effectively since the time previously spent in the unpacking, sorting, etc., of the goods could now be used for perusing the customs documents and checking them against the relevant tariff items.

A fully developed declaration system would make it possible to concentrate the work of customs handling in fewer and larger customs departments and thereby permit a better utilisation of the personnel.

There were no precise estimates of the total number of persons who would become redundant.

f) *One-man duty-crews*

The Directorate of Customs believed that when the system of one-man duty-crews had been fully developed throughout the country there would be a total of 50 new duty-crew units. In that case it would be possible to abolish a total of approximately 80 posts in the goods-handling personnel, also bearing in mind the division of duties into internal and external duties.

These estimates were based on the experience acquired as a result of a period of experimentation.

The Directorate prepared detailed instructions for one-man customs duty-crews.

2. *Staffing plans*

The Directorate prepared a number of staffing plans while rationalisation was in progress. These plans were readily revised as new rationalisation measures were tried out. The staffing plans concerned either a customs centre or a customs station, or a larger sector such as the frontier customs stations.

A staffing plan for the entire Customs Service was also prepared for the second phase of rationalisation. A reduction of approximately 550 persons is expected between 1st January, 1961 and 1st January, 1971. The number of vacancies due to natural wastage is estimated at 394. The plan has been prepared on the assumption that the personnel will be reduced as posts become vacant. The rationalisation measures upon which the reduction of the personnel is conditional will be applied progressively.

The outline plan covers all customs centres, customs stations and customs posts which were in operation at 1st January, 1961.

It contains particulars of the number of persons employed in each customs centre, station or post at 1st January, 1961 and the estimated staff at 1st January, 1971. The number of officials was broken down into the number of chief officers, the number of goods-handlers, persons on " external " duties and the number of persons performing clerical duties. Later, information about age-distribution was added.

TABLE SHOWING NUMBER EMPLOYED IN THE CUSTOMS SERVICE

DATE	NO. OF OFFICIALS
At 1st July, 1957	2,600
At 1st January, 1961	2,055
At 1st January, 1964	1,840
Planned at 31st December, 1970	1,500

III. INFORMATION AND CONSULTATION

The Director of Customs had central responsibility for information. The district managers were responsible locally.

The Directorate of Customs was to furnish complete information about the forthcoming changes. No information was to be withheld.

Information was given through the normal service channels. The officials' organisations were also kept informed so that they in turn would inform the officials.

It seems that when the information was passed on, by the officials' organisations or by the district managers, it was not always done with the same thoroughness. In some cases information did not reach the officials.

1. *Visits*

A document entitled " Instructions for the Directorate of Customs " states :

" The Director of Customs himself and the officials of the Directorate shall undertake frequent tours of inspection in the country in order to make themselves as fully acquainted as possible with local conditions and personnel and to ensure that regulations are complied with. "

The Director of Customs himself carried out many tours and paid several visits to customs centres where changes were due to take place. In the course of these tours he and other officials of the Directorate gathered information in accordance with the Instructions, but they also notified the personnel of the customs centre or customs station of changes and of their consequences. Related problems were discussed at the same time. Representatives of officials' organisations went on these tours.

2. *Meetings and conferences*

Information meetings were held for the officials' organisations. At these meetings the Director of Customs or other representatives of the Directorate described the rationalisation measures.

In the case of certain measures, information was combined with training. In the Customs School of the Customs Service three information conferences were arranged which were attended by a total of 60 officials. The purpose of these conferences was to give the officials an explanation of the reason for the changes, technical information about the changes and about the consequences they would have, and also an outline of further changes that might be necessary.

These conferences were also intended to provide the Directorate with information about existing conditions at the various customs centres and customs stations, and to give a hearing to the officials' views about the proposals.

3. *Contact men*

A system involving contact men was introduced to prepare detailed proposals respecting changes. The contact men were selected from among the officials to give the Directorate necessary information about working methods, etc., at the various customs centres and customs stations. In this way the Directorate would obtain the necessary basic data on which to construct its proposals.

4. *Negotiations*

A number of rationalisation measures were the subject of negotiations between the Directorate of Customs and the organisations of customs officials. These negotiations, which covered such subjects as gradings, seniority, and dismissals, coincided with the wage negotiations.

During the negotiations on the wage claims made by the organisations, the Directorate considered the following three questions of which the administration had long been aware, but which for a variety of reasons had always been deferred:

- *a*) the adjustment of the Customs Service's hours of loading and unloading to those of the ports;
- *b*) one-man duty-crews;
- *c*) division of the service into internal and external duties.

IV. ADAPTATION PROGRAMMES

1. *New recruitment*

As a result of the changes all new recruitment to the Customs Service was stopped.

Further, the Directorate of Customs was to ensure that redundant officials were placed in posts which progressively became vacant. With this in view lists were prepared for each customs district which showed:

- *a*) the provisional employment of the personnel;
- *b*) the final allocation of the personnel.

In addition, the Directorate of Customs gave the local administration a general order that replacements should not be appointed during sickness, leave, military service or while posts were vacant for other reasons, if the work could be done by redundant officials.

2. *Local redundancy problems and transfers*

Even though the Directorate of Customs had expressed the view that natural wastage would determine the rate of rationalisation there were certain exceptions. This was necessary for the effective completion of the measures.

The frontier customs co-operation is an example. After the changeover the authorities were faced with the problem of redundancy along the Swedish border, while there was a personnel shortage in other parts of the country. The Directorate endeavoured to encourage mobility among the personnel by means of notices inserted in the Customs Service periodical.

Officials in redundant posts were asked to submit applications for posts advertised as vacant. They could also state preferences for duty stations with no immediate vacancies, in case a transfer could be arranged. No transfer would take place before the official concerned had found a house. It was pointed out that redundant officials who were not prepared to transfer were liable to dismissal under the Public Officials Act.

In actual fact no established officials were dismissed from the frontier stations. This is apparent, *inter alia*, from a statement from the personnel office of the Directorate of Customs, dated October 1963, which described the personnel situation in the frontier customs stations after rationalisation, and showed that no officials of the closed customs stations and customs posts were dismissed or obliged to accept transfer. As a result of voluntary transfer there are now only 23 officials in closed stations or customs posts, and these are employed temporarily on patrol duties or as reliefs.

When the general rationalisation plans became known to the persons employed in the Customs Service, a number of them sought posts outside the service on account of their personal estimation of their own prospects in the Customs Service. Redundant personnel were subsequently transferred to these posts. Such transfers were simple when they took place within the Oslo Customs Centre, but were difficult when other customs centres were involved. Due to the housing situation, for example, no persons were transferred to duties in Oslo from other customs districts.

3. *Financial assistance on transfer*

The Customs Service has general rules for financial assistance in the event of transfer from one customs centre to another. If the transfer entails a change of residence the Service pays the removal expenses.

At the frontier customs stations there was another problem. In very many cases these stations were situated in remote places where there were no other activities. A number of officials had built houses at their own expense in these localities, and these would be hard to sell.

This problem was the subject of a general discussion in negotiations between the Directorate of Customs and the Norwegian Federation of Customs Officials. In cases of this kind, involving officials in financial difficulties, the Directorate agreed to do whatever was reasonable and proper, but was unable to make any absolute general promises.

4. *Training methods*

As we have already stated, the Customs Service has its own Customs School. As new routines, working methods and other changes were introduced, the new arrangements were incorporated in the normal instruction given at the school.

In the overwhelming majority of cases the changes were effected by making changes in written instructions for the performance of the work. In that way the personnel received the necessary training at their place of employment. This was adequate in very many cases.

The changes made in connection with frontier customs co-operation, however, were such that thorough training was necessary. Swedish customs officials came to Norway to acquire an adequate knowledge of the duties of Norwegian customs officials, and Norwegian officials went to Sweden for the same purpose. Training took the form of courses.

A Norwegian customs inspector, who was employed as a teacher for the Swedish customs officials, was also given the task of giving information to Norwegian customs officials and training them in the new provisions governing frontier customs co-operation.

When random control replaced the full control of all traffic, it was carried out in a number of different ways. This resulted in the officials being given more thorough instructions as to how such control should be undertaken.

5. *Dismissal procedure*

The Public Officials Act of 1918 contains provisions respecting the dismissal of public officials. Generally speaking a public official with less than three years' service may be dismissed with three months notice. After the completion of three years' service, a public official may also be dismissed if his post becomes redundant or is abolished; the period of notice is then six months. There is provision for reduced pay for a period of up to two years for a dismissed official with not less than 15 years' service; an official with less than 15 years' service shall as far as possible be given an opportunity to take up another service post with the same employing authority, and as far as possible in the same branch of the service.

The Directorate of Customs believed that it would not normally need to have recourse to the provisions of the Public Officials Act regarding dismissal. Each year numbers are reduced by officials attaining the age-limit, finding other employment or dying. As a result of the rationalisation measures, however, it might be necessary to dismiss temporary officials in order to make room for established officials who had become redundant.

In 1958 the question of dismissing temporary customs officials arose. Between 40 and 50 officials at the Oslo Customs Centre were affected. The Norwegian Federation of Customs Officials was notified.

The Federation made efforts to have the dismissed officials placed in other employment, and also raised the question of seniority. It took the view that the question of dismissal should be examined in conjunction with the seniority of all temporary officials, in whichever part of the country they were employed. Many of those due for dismissal at the Oslo Customs Centre had more than three years' service, and it was unfair that they should be dismissed *en bloc* when it was probable that temporary customs examiners in the country with a considerably shorter period of service would keep their posts. The Federation therefore requested that a seniority list of the temporary customs examiners throughout Norway be prepared and used as a basis for dismissals and consequent transfers.

The Directorate of Customs pointed out that the dismissal of redundant temporary officials at Oslo Customs Centre was being carried out in accordance with rules drawn up after discussion between the district manager and the local officials' organisation, the Oslo Officials' Association, and based on wage-seniority.

In any case, it would in due course be necessary to abolish temporary posts in the country's remaining customs establishments. The Directorate of Customs did not, therefore, think it advisable to have temporary customs examiners transferred from Oslo to other centres in the country in replacement of younger temporary officials, since it was highly probable that they would become redundant at the duty station within a short time.

The Directorate did, however, agree that there were grounds for treating the two customs centres in Oslo as one for the purposes of the dismissal of temporary personnel.

At the discussions between the Directorate and the Norwegian Federation of Customs Officials on dismissal procedure the Directorate agreed, as a result of a proposal from the Federation, that whereas service in the customs should be taken into consideration first, it was reasonable that if a person had performed other government service, half of such service should count as service in the customs.

6. *Employment of redundant personnel*

Both the Directorate of Customs and the Norwegian Federation of Customs Officials examined the question of having redundant personnel transferred to the police. Redundant personnel were invited to apply for appointment to the police. The police authorities gave no priority whatever to the officials of the Customs Service, who were treated in the same way as other applicants. The result was that a few of the customs personnel were engaged in the police.

On another occasion officials in the Customs Service were invited to apply for posts in a large Oslo undertaking.

The Directorate discussed with the Ministry of Finance the question of transferring redundant persons to other government services but no significant results were achieved.

V. ADMINISTRATION OF WAGES AND SALARIES

The rationalisation measures in the Customs Service affected the negotiations which the Directorate of Customs was having with the organisations of customs officials about grading regulations for the officials.

The negotiations conducted in 1961 were based on the rationalisation plan for the year 1961-1970. They resulted in the upgrading of certain posts. The grading regulations set out clear principles for the gradings which are conditional upon the officials accepting the contents of the rationalisation plan. The actual words used are:

" The provisions presuppose that the Norwegian Association of Customs Personnel and the Norwegian Federation of Customs Officials will encourage the officials to co-operate positively in the implementation of the rationalisation measures contained in the Rationalisation Plan for the Customs Service (1961-1970) and any new measures that may be introduced for the purpose of rationalisation. "

The initial effect of the new administrative system introduced was to reduce the number of senior posts in the Customs Service.

To a certain extent the transfers of redundant personnel from the frontier resulted in promotion for the officials concerned. This was not due to any deliberate policy on the part of the Directorate of Customs, but is rather a reflection of the attitude of the frontier personnel to their being " pressed " to apply for new posts.

Chapter VI

SWEDEN

INTRODUCTION

The seven Swedish cases cover three private companies engaged in manufacturing, one private department store operation, and three government enterprises. The industrial studies include one for the steel industry, another for shipbuilding, and a third for the manufacture of paper containers. The three government operations represent the telecommunications, the railways and the postal bank systems.

Three industrial studies relate to the construction of new facilities and the transfer of production from an old plant to a new one. The shipbuilding operations were transferred ten kilometres from the older site. The department store moved its wholesale warehouses from Stockholm to a central warehouse some twenty kilometres south of the City. In contrast, the telecommunications case study is based on the experience with the gradual conversion from manual to automatic telephone operations. The railways undertook the re-arrangement of the administrative system within the organisation, involving the creation of two distinct functions each with its own regional organisation. A data processing system and a new central bookkeeping system replaced older procedures in the Postal Bank.

The studies were conducted under the general supervision of the Swedish National Labour Market Board. The four studies of the private firms were made by the Swedish Council for Personnel Administration. An officer of the Council visited the firm and reconstructed the history of the change from the time of management's initial consideration of the innovation until the final decision, through the installation and then to the period immediately following the changeover. The officer interviewed the management and representatives of the employees and examined the written records and house journals, including the minutes of works council meetings at which management had informed the employees of the technical change and the resulting administrative measures (training, job transfer, etc.) to provide for the work force.

The studies of the governmental agencies were made by the managements of these enterprises. The National Labour Market Board discussed the project with them in detail but the descriptions and the conclusions are those of the management.

The Council and the managements of the government enterprises followed the " Guide for Case Analysis " provided by the Social Affairs Division of the OECD.

Five of these studies relate to the introduction of new techniques and processes. The paper mill adopted a method of production tested in the United States. The steel mill similarly applied new accepted techniques, but the shipbuilding company evolved independent technical production processes. The Telecommunications Administration replaced manual by automatic dialing and the Postal Bank introduced a new computer system.

The Telecommunications Administration reported the most extensive planning period, as the introduction of the automatic dialing system is part of a continuous process of development. The period between the decision to introduce the technical change and its final realisation varied from one to five years. The vast change made by the shipbuilding firm called for a very long period of planning.

The personnel requirements under the new system were estimated at a very early stage in most of the cases, except in the Postal Bank and the warehousing operation. All companies reported considerable efforts to keep the employees and the unions and works councils informed of the changes and usually engaged in considerable consultation and close collaboration with them on the detailed plans for the changeover and the provision for the employees.

Careful methods of selection of persons for the new jobs were used in most instances and in the case where such procedures were not followed many difficulties were experienced in the operation of the new plant. Existing training systems for employees were adapted to the new needs or new systems instituted. The Telecommunications system turned to the National Labour Market Board for assistance in training.

The companies called upon the central and local authorities to arrange housing facilities and transport and the National Labour Market Board to help find new employments for surplus labour.

The adjustment process tended to be most successful in enterprises which were expanding.

Case I

NEW SKILLS AND THE OLDER WORKER — PROBLEMS OF A ROLLING MILL

I. INTRODUCTION

This is a description of the installation and commencement of operations of a new rolling mill, the shut down of an old one, the resulting manpower problems, and the measures by which management tried to reduce the impact of these changes.

Avesta Jernverks A.B. was founded in 1883 at Avesta, a town with about 11,000 inhabitants situated in the eastern part of the old ironworks district of Sweden. The company has 3,000 employees and is the only major industrial enterprise of the town. A.J.A. was the first manufacturer of stainless steel in Sweden and is now one of the foremost manufacturers in Europe.

The installation of a new rolling mill began to be discussed in the autumn 1959. An old 1917 rolling mill, one of the intermediate production units, did not meet present day requirements both with respect to quantity and to quality. It had been built not for stainless steel but for merchant iron, and had been heavily used and was mechanically worn down.

In February 1961 a preparatory team presented its proposal to the board. In May 1961 the proposal was adopted with a few minor changes, and November 1963 was fixed as the date when the new plant would start operating.

Three planning teams were appointed, two to deal with organisational and technical aspects of the change, and the third to be responsible for questions of manpower and working methods, The teams had overlapping membership, and their work was also co-ordinated by the Technical Director.

On 1st November, 1963, the first billet passed through the set of rollers in the new plant. Six weeks later production had attained the quality and quantity fixed as criteria for full operation. This meant that the old plant could be closed down before Christmas 1963, instead of in March 1964 as planned.

II. THE OLD AND THE NEW

The old plant had a capacity of 90 tons per shift; the new about 350 tons per shift. The old plant employed 68 rolling mill operators and one machinist; the new 38 rolling mill operators, 4 machinists and 3 pump-room mechanics.

There is a considerable difference in working conditions. The old premises were dark and uncomfortable. Much work was done by hand and was physically arduous. The antiquated equipment required much skill and knowledge of the workers. They worked in teams and could talk to each other.

The new premises are light and airy. The workers are dispersed about the plant and have no contact with one another except by signals and telephones. Work is directed by the materials supervisor, who can co-ordinate the operation between steelworks, furnaces and the rolling unit by telephone, electronic control board, and industrial television. The modern equipment requires different experience and skills from the old. It is important that the workers should be able to watch the control panel and react rapidly and correctly to signals. The instrument system is complex and a thorough understanding of the way in which it functions is necessary.

III. PLANNING MANPOWER REQUIREMENTS

The manpower team began its work on 1st April, 1963. The plant was divided into three sections, and a sub-committee was appointed for each with the main object of assessing how the work should be organised in the respective sections. The suppliers of the equipment and the structural engineers were consulted.

The staffing plan for the new plant set the need at about 40 persons. Each employee would be required to know at least two jobs. It appeared that the best way to get the new plant into operation with as little friction as possible was to introduce trained instructors, and to transfer those selected for the new jobs to the new plant as the installation proceeded, using their respective workplaces for training.

It was decided to invite applications from all the rolling mills of the company, thus extending the scope of recruitment to 900 persons. This was done for two reasons. First, it was necessary to keep the old plant in production until the changeover was completed. Second, the average age of employees at the old plant was high. 39 of the 69 were fifty or older. Adjustment to the new production methods might be very difficult for them.

From among the 900 rolling mill workers there were to be recruited, selected and trained 6 to 7 instructors for as many key-posts, and 30 to 35 workers, who should be ready to perform their jobs by 1st November, 1963.

Since the old rolling mill was to close down, it was felt that its workers should be given a certain priority. The redundancy that could not be avoided when the old mill closed down made external recruitment impossible of course.

IV. INFORMATION

The employees of A.J.A. are normally informed of plans and measures affecting the personnel, but the comprehensive information associated with this case was a new step. The workers' representatives were consulted from the very beginning when the personnel policy came up for consideration. The chairman of all the trade-union groups in the rolling mill and representatives of the branch executive were informed about the plans of the company by the heads of the rolling mill and the training department.

From mid-April the trade union representatives were kept continuously informed. The head of the rolling mill informed the works council, and put up a notice inviting all workers, foremen and other interested persons in the rolling mill to attend specially arranged information meetings. The staff of the old rolling mill and the billet department received an invitation by personal letter. Altogether six information meetings were held on three days at the beginning of May 1963, and were attended by about half of the invited personnel. At these meetings the head of the rolling mill explained how the management saw the future of the rolling mills and gave the background to the decision to build a new rolling mill. He also gave an account of the new plant, its equipment and way of functioning. The head of the training department described the planned training activity, and a consultant from the Swedish Council for Personnel Administration told employees about the selection tests.

On 11th November, when the dismissals were announced, the works council, the organisations of the employees, the Director of the County Labour Board, the representative of the town and the press were told that dismissals would take place after the end of the year.

The workers affected were invited by letter to information meetings where management representatives explained the company's position, and a trade union representative spoke on union matters. A representative from the local employment exchange gave information on the demand for labour and the various forms of aid available to persons willing to move to another community. A representative from the County Labour Board gave an account of training facilities.

The introduction courses described below may also be regarded as part of the information activity.

V. MANPOWER REDEPLOYMENT

1. *Dismissals*

Dismissals could not be avoided for several reasons. The world production of stainless steel suffers from excess capacity and consequently there is hard competition on the market. Owing to the rationalisation of maintenance work in the company, a number of maintenance workers became redundant as early as the spring 1963. It was, however, possible at that time to employ them on the construction of the new plant. But the whole organisation had for some time been subjected to rationalisation, and as the new plant was completed, the company could no longer reduce its personnel by normal wastage at the pace required. The dismissals were thus a consequence of the market situation and continuing rationalisation, with the rapid commencement of operation within the new plant as the initiating factor.

Dismissals were announced on 11th November, 1963. The company compiled a list of employees who would have to be dismissed. Due regard was paid to seniority, but the company's requirements of skilled personnel were also taken into consideration. The list was handed over to the executive of the trade union branch, and, after negociations involving minor changes, agreement was reached. The company then sent letters to the workers affected, telling them that they would have to be dismissed and inviting them to information meetings.

2. *Transfers*

As the majority of those affected by the dismissals were persons with the shortest seniority, those who left were generally young. They were scattered all over the plant, which necessitated many transfers.

The workers, older ones in the main, who became redundant when the old rolling mill was shut down had to be assigned to new jobs. The aim was to try to find jobs where the physical demands were not too great, but with payment and status high enough to satisfy workers who were often very experienced and competent.

The average age in the enterprise as a whole is comparatively high. There are furthermore several workers suffering from some physical impairment. In order to find out how the resources and qualifications of the disabled and older workers could best be utilised, it was decided to let them have a thorough medical examination and to make a bio-technological investigation of all less arduous jobs in the production departments. At the same time workers with some physical impairment are as far as possible offered retraining opportunities within the enterprise. These measures to find suitable jobs for workers who had to be transferred have not yet been completed.

3. *Recruitment and selection*

In order to improve the reliability of the selection of instructors as well as workers, it was decided to introduce psychological tests. These have never before been used by the company in connection with the employment of un-promoted personnel.

At the May information meetings it had been explained that those who wanted to be considered for employment at the new plant must put their names down for the selection tests. Of the 68 workers in the old plant, 42 applied for employment in the new plant (about 62 per cent). Of the approximately 800 employees belonging to other rolling mill departments, 62 (about 7.5 per cent), of whom 14 were from the billet department, sent in an application

All applicants had to undergo a basic test and were, at the same time, subjected to an examination by the supervisors. A good 50 of the applicants were then selected, of whom 20 of the most qualified were subjected to special tests for instructors and the other 30 to selection tests for allocation to suitable jobs. The selection tests were designed to measure such characteristics as adaptability, comprehension of technical matters, ability to co-ordinate, and swiftness and accuracy of reactions.

Among the applicants from the old rolling mill, higher age was found to correspond to lower test results, whereas no similar relation seemed to exist in the case of any other group of applicants. The groups are, however, small and deductions hazardous. A reasonable explanation could be found in the fact that the workers of the old rolling mill were more anxious to be employed at the new plant. The result was that many old workers from the old plant applied for a transfer who would probably not have applied if their former jobs had remained. This category of older workers in the other departments was not threatened by unemployment or the transfer to lower paid jobs and thus had no reason to apply for a new job.

Of the 42 applicants from the old plant, 20 obtained a job in the new one. Of the 62 applicants from other departments, 28 were transferred to the new plant. A large proportion of the older workers of the old plant did not find jobs in the new plant, which naturally created problems when the old plant was closed down and they had to be transferred to other jobs.

VI. TRAINING

1. *Training of instructors*

Special training was arranged for those who had been selected for jobs as instructors. A consultant from the Swedish Training Institute was responsible for this training, which was also attended by supervisors and methods engineers. The course, which was of one week's duration, concentrated on how to divide up the tasks into suitable steps for instruction, and on the planning, issuing and following up of instructions.

2. *Job instructions*

After the course, the instructors, under the supervision of an experienced instructor and advised by methods engineers and supervisors, had to write working instructions for all jobs in the new plant, based on the working methods determined by the methods engineers in collaboration with the management. The technical data and directions supplied by the contractor on the use and maintenance of the equipment were of great help in this task. As the different units were installed the instructions were completed and instruction of the other personnel could begin.

After the course of instruction a form was filled in showing that:

a) The course of instruction had been completed.
b) Training had taken place.
c) The worker had learnt the job (control).

The company has never before trained instructors on as large a scale as this, nor have written instructions previously been used to the same extent. The results have been very satisfactory with no damage to equipment which could be ascribed to inadequate training. It is felt that there would have been no advantage in training production workers by letting them take part in the installation.

3. *Introductory courses*

It was considered important that the personnel selected should from the very beginning show a positive attitude towards their new job, develop a group feeling and as soon as possible feel at home in the new environment. For this purpose a special introductory course was arranged. Instructors and supervisors were required to attend a two-day course devoted to a study of methods for each production unit (e.g. set of rollers, pit furnaces, plate shearing), and a summing-up of their duties as instructors and advisors. All workers, instructors, and supervisors then jointly attended a three-day course, consisting of:

a) Technical presentation and demonstration of the plant.
b) Orientation on steel production (the production process before the rolling mill stage).
c) Orientation on maintenance departments.
d) Information about production technique.
e) Wage calculation methods, etc.
f) Prevention of industrial accidents, and fire and plant regulations.
g) Trade union information.

Altogether seven such courses were held. According to the results of an inquiry, the workers were very satisfied with the courses which had given valuable information and at the same time made it possible for them to become acquainted with their superiors and fellow-workers.

4. *Other training*

Occasionally individuals were sent away on special training. Thus three supervisors and five machine operators spent two weeks at another ironworks with similar rolling equipment in order to receive training under ordinary operating conditions.

VII. Wages

One of the questions which most troubled the workers in advance was whether they would be able to earn as much as before. In setting the wage rate for a job in the new plant, consideration had to be given to the previous wage level of those who were transferred to it, as well as to the fact that the wage rates in the new rolling mill could not be allowed to deviate too much from the wage rates for similar jobs in other departments.

During the training period each trainee was paid according to an hourly wage rate equal to his average earnings during the previous three months.

Negotiations concerning the wage rates in the new plant were initiated in October 1963. They resulted in the decision that during the period between completion of training and the establishment of preliminary piece-rates, workers should get an hourly wage rate, based on job evaluation and corresponding to 90 per cent of estimated final piece-rate earnings. In addition, retroactive payments were to be made amounting to the difference between the hourly wage rate and the average earnings during the first four weeks of piece-rate working.

By the turn of the year preliminary piece rates were established. They contained a fixed element amounting to 75 per cent of estimated final earnings. The piece-rate system was intended to stimulate a rapid commencement by basing the retroactive payment on the average earnings during the first four weeks, and by granting a progressive supplement for idle time in addition to the earnings based on production results. This supplement means that the worker earns more if he can report that the plant operating at 70 per cent of its capacity has been idle 30 per cent of the time than if it has been idle 20 per cent or 10 per cent of the time. The idea behind this system was that it should make it possible to form an opinion of the capacity of the plant from the very beginning, while at the same time stimulating the workers to learn to work rapidly.

It was crucial that the handling time should be reduced to a minimum, since the material had to pass through the plant as fast as possible so as to avoid unnecessary heat loss and obtain the best possible rolling temperatures.

It can now be said that the earnings of the affected personnel have, on the average, remained at a more or less unchanged level. The workers who were transferred to the new plant have generally attained somewhat higher earnings, whereas the average earnings of the other workers have so far been slightly lower. This in part depends on the difficulty of finding comparable jobs immediately for the skilled and experienced workers from the old plant.

VIII. ATTITUDES TO THE CHANGE

Views expressed by representatives of different groups within the organisation high-lighted the following points:

1. Careful planning and good collaboration had been of decisive importance.
2. The detailed information given was appreciated by employees.
3. The decision not to use regular staff for the installation had proved a great advantage. Installation by specialists presented fewer problems and saved time.
4. The production workers learnt their jobs just as easily under the supervision of instructors, and by training on completed units, as they would have by taking part in the installation.
5. Representatives of the employees took a favourable view of the system of using instructors and written instructions and of the systematic introduction.
6. The activity of the instructors had been valuable in easing the burden on supervisory staff in the early stages of the new rolling mill.
7. As a result of a request from the trade union, the chairman of the local union branch was given a mobile job so that he could have access to the scattered places of work in the new plant.
8. The dismissals caused concern. Had the market situation been more favourable it might have been possible to assign the redundant workers to other jobs in the enterprise.

Case II

ADJUSTMENTS TO CENTRAL PLANNING AND PRODUCTION CONTROL IN A NEW SHIPYARD

I. INTRODUCTION

Götaverken, centrally situated in Gothenburg, Sweden's second city and largest port, has a century-long tradition in shipbuilding. At the end of the 1950s it employed over 7,000 persons, of whom 1,700 were salaried employees. Its activities comprise shipbuilding and repairs as well as the manufacture of marine diesels, stationary boilers, hatches, etc. The yard had five building berths and could construct ships up to 42,000 tons dead-weight. Towards the end of the 1950s about 140,000 tons gross were launched annually.

1. *Reasons for the change*

There were three reasons for the decision to build an entirely new yard on a site at Arendal, about 8 kilometres from Gothenburg. First, there had been a shift in demand towards ships over 42,000 tons d.w. Second, in the face of stiffening international competition, it was necessary to cut production costs by a high degree of rationalisation, which would not have been possible in the old yard. Third, there was no space for expansion at Götaverken.

The intention was to transfer the building of standard ships, mainly tankers, to the two building docks of the new yard, whereas the construction of diesel engines, repairs, and the building of specialised vessels, e.g. regriferated vessels, should remain in Gothenburg, where three of the five berths would be closed down. The change implied a concentration on standard ships as well as a radical alteration of production techniques.

The decision to build was made in December 1957, and work on the site started in March 1959. The new shipyard was inaugurated in May 1963.

2. *The new Arendal shipyard*

The shipbuilding principles at Arendal are very different from those practised in conventional shipyards. At Arendal the lay-out is based on the straight production line, which has made it possible to build a ship in about half the ordinary time. Workshops, handling departments and stores have all been placed with a view to reducing transport to a minimum. New machines, lifting devices and other transport equipment have further reduced handling time and made it possible to eliminate much of the heavy work traditionally belonging to shipbuilding.

The rational transport system meant that, instead of operating over a wide area, workers were assigned to workstations which required a certain amount of specialisation.

In order to secure an even flow of production it was necessary to centralise production planning and control into one department. It was also necessary to obtain a more accurate knowledge of the time required for each task and for this purpose the MTM technique was used, as far as is known for the first time in a shipyard. Originally MTM was only to be used as a basis for production planning and control, but it was later decided that it should be used for the setting of piece-rates too.

It should be added that most work takes place indoors, a great advantage in the climatic conditions in Sweden.

3. *Preparations for the change*

At the turn of the year 1959-60 two project teams were formed: the first with the task of planning the new production, and the second to make methods analyses and prepare job specifications. These teams were reinforced gradually over the three-year preparatory period, and there was some interchange of membership between them. Towards the end of 1962, for example, 15 members of the methods team joined the planning team. Supervisors joined the planning team temporarily in connection with the planning of their departments and thus had an opportunity to express their views at the preparatory stage. Supervisors also participated in the work of the methods team for periods of from three to six months.

II. INFORMATION AND CONSULTATION

1. *The works council*

The works council was informed of the company's decision to build a new shipyard in December 1958. " The Shipbuilder ", No. 1, 1959 (the company's own quarterly), contained a detailed account of the background to the decision as well as of the new shipyard to be built, and subsequent issues described the construction and installation of the new plant at Arendal, and the negotiations and decisions affecting the personnel.

Joint deliberations during 1959 and 1960 were concerned for the most part with transport, canteens, changing rooms, and similar amenities. For example, the original plans for canteens and changing rooms were altered at the request of the employees who wanted them near the workplaces instead of centralised.

In 1961, activity was concentrated on planning for the transfer of workers. In September the works council held an extra meeting which was entirely devoted to the Arendal shipyard and the timing of the transfers. It was decided that the measures to be taken to inform workers about the changes should be planned and implemented within the framework of the works council. For this purpose a special committee was set up consisting of the production manager, the personnel manager and the deputy chairman of the works council who had already for many years been chairman of the trade union local branch.

One of the first tasks of the committee was to arrange demonstrations of the plant for the employees and their families. No less than five demonstrations were arranged during 1961 and the first months of 1962. Altogether they were attended by 9,000 visitors. In addition, a printed booklet, " Welcome to Arendal ", was sent to the homes of all employees.

At the beginning of 1962, the committee arranged a series of information meetings immediately after working hours. The meetings began with a dinner provided by the company, and were addressed by the personnel manager and the production manager. Those present were then invited to put questions to the committee. Altogether 10 information meetings were held. They were arranged for each workshop separately.

These meetings were followed by the issue of the questionnaire to all employees.

2. *Relations between the company and the employees' organisations*

As soon as it had been decided to build a new shipyard at Arendal, the company informed the various employees' organisations of the decision, and thereafter kept them continuously informed of their intentions.

Once it had been decided by way of experiment to introduce MTM as a basis for piece-rate setting at Arendal, the company entered into negotiations with the local union branch and towards the end of 1963 a local agreement concerning MTM and job evaluation was reached.

It was realised early on that the executives of the local union branch had to have a thorough knowledge of the functioning of the MTM system if they were to be able to give their members accurate information. It was, therefore, decided that the chairman, deputy chairman, and secretary should receive the complete 6 weeks training in MTM. In addition, the production manager, the head of the work study department and the personnel manager, together with the local negotiating delegation of the union, visited certain enterprises which had for some time been using the system.

Certain workers also received full information about MTM and job evaluation. The aim was to have at least one labour representative who understood the system in each department, so as to forestall suspicion and conflicts. A management-labour sponsored training course in MTM was organised in 1962, with the secretary from the Metal Workers' Trade Union as instructor. Some 15 workers, selected by the union, attended this course, which was also attended by some salaried employees. The company paid all expenses for the course as well as full wages during the training period.

Management-labour consultations were not limited to the introduction of MTM but covered all essential questions, including the planning of the initial study. After the selection, the union requested that certain workers who had not been selected, but who were deemed particularly suited to be piece rate evaluators or members of the job evaluation committee, should be included. The company agreed to this request.

III. REDEPLOYMENT OF MANPOWER

It was taken for granted that manpower needs should as far as possible be solved by transferring employees from the Gothenburg shipyard to Arendal. Since three berths were to be closed down, no major external recruitment seemed necessary. The number of persons who would have to be transferred after the first building stage had been completed was roughly estimated at 1,500, salaried employees included. The majority would be transferred during the first half of 1963.

In fact, events turned out differently. Soon after the transfer began, the company received orders which meant that part of the employees who were to be transferred had to remain at Gothenburg. Some external recruitment to Arendal was therefore necessary. This amounted to about 400 of the 1,100 workers eventualy employed there.

1. *Selection principles*

The principle guiding the selection of the workers for Arendal has been that every worker should be able to choose whether he wanted employment at the new shipyard. Certain special categories have not had this choice, since they belonged to groups for which there would no longer be employment at the Gothenburg shipyard, and they had to choose between being transferred to Arendal, asking for another job at the Gothenburg shipyard, or leaving.

As regards the salaried employees affected by the change, the situation was somewhat different. Of the 350 who would have to be transferred, about 220 had no choice except to leave, since they were members of the draughting and ship-designing department which was transferred entirely to Arendal. Other salaried employees, such as production planning and control staff and foremen, were mainly selected on the basis of free choice.

2. *Recruitment of staff for production planning and control*

During the three years up to the end of 1962, the heads of the planning team selected the staff for production planning and control which eventually numbered about 50 persons.

The selection was to a great extent made from among workers and foremen. As a rule the workshop supervisors made a preliminary selection of candidates whose suitability was then carefully examined by means of psychological tests arranged by an independent consultant.

The main reason why the selection was made chiefly among workers and foremen was the desire to staff the planning department of Arendal with persons who had experience of practical work and who would be certain to speak the same language as the foremen and workers with whom they would have to co-operate. It was also felt that this method of selection would minimise possible conflicts arising from the new methods of production, with highly centralised control, and the old. At the old shipyard foremen and workers enjoyed a high degree of independence in their work and were not used to much meddling from specialists. For the same reason the number joining the team at any one time was kept small, and the first group was selected with particular care.

The recruitment of sufficient personnel for the production planning team encountered no difficulty, since selection generally meant a fine chance for further training, and prospects of promotion.

3. *Recruitment of work study personnel*

Only five of the 25 members of the team set up to prepare job specifications were trained work study men. The others were recruited from among foremen and workers. During the spring 1962, as the new organisation began to take shape, the team was reinforced by some twenty foremen and other members of the planning group in order to speed up the methods work. Their participation in the work of the team was, as a rule, of three to six months' duration.

Of the 25 members of the original group no more than three belong to the present work study department. The majority joined the planning team towards the end of 1962. One of the others is now training engineer and five are foremen. New recruitment to the work study department has been made primarily from a group of 60 skilled workers, who towards the end of 1962 took part in psychological selection tests.

4. *Recruitment of supervisory staff*

Of the 60 foremen at Arendal the majority previously held the same posts at the Gothenburg shipyard. The others either belonged to the planning or work study teams or worked as supervisory candidates. The selection was made by the production management.

The foremen and supervisors were as a rule transferred to Arendal a couple of months before the rest of the personnel so as to enable them to become thoroughly acquainted with the new plant.

5. *Recruitment of workers*

Early in 1962 questionnaires were sent to employees asking if they wished to work at Arendal. 2,728 out of 3,098 replied. Supervisors and foremen were given lists showing how their workers had answered. Together with the production management at Arendal, they selected the workers for the new shipyard on the basis of these lists. It was sometimes possible to persuade workers who were regarded as particularly suited for employment at Arendal to accept a job there, though they had originally answered no.

The selection was made without consulting specialists as to the suitability of the " applicants ". When workers were assigned to their new jobs they were allocated, where possible, to teams where they were known to get on well with their mates and the supervisory staff.

The setting of an upper age limit for those who wanted to be considered for employment at Arendal was intentionally avoided, since the company wanted the age structure to be as close to a normal age pyramid as possible. Persons over 60, however, were selected only in exceptional cases, as the transfer was considered to entail greater adjustment difficulties for these groups than for younger workers.

IV. TRAINING

1. *Training of planning work study and supervisory staff*

The supervisory staff and the personnel concerned with production techniques at Arendal generally have the theoretical training required by the company. Part of this training is common to both groups and includes theoretical vocational training and a basic course in production techniques. The basic knowledge may be acquired by correspondence course or in a technical school, or by participation in the internal training courses of the company. For those who want to become foremen, this training is then supplemented by internal courses in work supervision. Those who want to become production technicians have to attend courses in MTM, job evaluation, performance rating, etc.

The company endeavours to give the supervisory staff practical experience of work studies and production planning, and encourages some mobility between production, production planning and control, and work studies. The interchange of membership between the two project teams, and the participation of supervisors in the work of the teams, were partly training devices.

2. *Training and introduction of workers*

No comprehensive training activity was considered, since the majority of the selected workers were skilled and often had a good theoretical background. Such training as was arranged was, as a rule, of a complementary nature. Whether or not it was required was decided by the supervisory staff from case to case.

A special training problem was created by the fact that many workers would have to adjust themselves to new working methods after the transfer to Arendal, where it was essential to observe strictly the methods prescribed in the methods analyses.

Such adjustment was necessary, for instance, in the case of acetylene cutting operators who had previously as a rule worked by hand. A certain resistance was to be expected from these workers who were proud of their skill. An information and training course was arranged to induce them to abandon their old working habits and to use such auxiliary equipment as speed regulation devices, and hand cutting machines.

The success of all training activities is mainly ascribed to the following circumstances :

a) The workers experienced no loss of earnings during the training period.

b) Care was always taken to inform the representatives of the union in advance about the type of training planned and the workers who would be selected.

c) Members of the first teams were selected from among workers who were considered to have particularly positive views. The contented atmosphere of the first groups influenced the attitude of those following.

d) Efforts were made to make the workers see the advantages of the new methods.

Of the 400 externally recruited workers at Arendal, about 50 per cent attended some form of training arranged by the company. By offering basic training in a trade it was possible to recruit workers with a certain amount of ambition, and not merely interested in earning high wages as soon as possible. They were paid during the training period, but this pay was considerably lower than the wages they would have been able to earn immediately as unskilled workers.

The introduction consisted of a general survey, an account of various questions affecting the personnel, and a description of the functions of the different departments and the routines at the new shipyard.

3. *Partially disabled*

There were about 500 partially disabled workers at Götaverken and it was possible to transfer about 50 to Arendal. Direct retraining of these workers was organised, inter alia, in connection with the training of truck drivers. Further, four deaf-mutes received training in automatic welding.

V. WAGES AND SALARIES

1. *Wages in the transfer period*

The majority of the transferred workers had, in the Gothenburg shipyard, been working on piece rates, which were to a great extent subsequently determined by the supervisor in question. Group piece-rates were also fairly common. The wage level was high in comparison with average industrial wages.

The agreement negotiated with the union about Arendal provided that the transferred workers would be paid an hourly wage rate equal to their average hourly earnings during the second and third quarters of 1962, until the new piece-rates had been determined.

It was later found that many of the workers who had been transferred to Arendal did in fact earn less than they would have done if they had remained in Gothenburg. The reason was that there was a considerable wage drift at the Gothenburg shipyard after their wages had been determined. This decrease even caused a few workers to leave. At the request of the union the wages were later adjusted so that they corresponded more accurately to the wage level at the Gothenburg shipyard.

2. *Adjustment to the new piece-rates*

The prospect of the new piece-rate system had engendered a considerable amount of suspicion among the workers. Their main fear was that it would result in a speed-up. Those who were most opposed to the system were generally those who had from the beginning indicated that they did not want to be transferred to Arendal.

In August 1963 the first workers went over to MTM piece-rates. So far the new piece-rates have been introduced for nearly all workers in the welding shop and about half of the workers in the plate shop. The results have been very good and most workers have attained 120 per cent (in some cases 130 per cent). Standard performance is 100 per cent.

The good results are in part explained by certain provisional supplements, which it was deemed necessary to grant as long as the preconditions on which the piece-rates are based do not exist. The supplements will be abolished as soon as the system functions as it should.

The workers' attitude to the MTM method seems to be that the wage rates are now determined on a more objective basis and are therefore more equitable. The production management as well as the union appreciate that the piece-rate negotiations will be easier, since they can now be based on facts.

The successful introduction of the MTM piece-rates is probably to some extent due to the methods control activity whereby the labour representatives who received MTM training were entrusted with the task of following up all new piece-rates during the initial period and ascertaining whether they had been correctly set. At first these representatives were sometimes accused of " running the company's errands ", but as the workers became used to the piece-rates and found that they could achieve good earnings, the criticism ceased.

3. *Salaries*

As has been mentioned, a large group of salaried employees could not choose between remaining at Gothenburg or going to Arendal. At the negotiations their organisation claimed compensation for higher travelling costs. The company did not agree to this since it would have induced the other organisations to make the same claim.

The company had estimated that about 5 per cent of the drawing office staff would leave. In fact about 15 per cent left, which was a very high turnover. The reason stated by those who left was, as a rule, the longer journeys and the company's refusal to compensate them for their increased travelling expenses. On the other hand, other shipyards in the vicinity have had a similarly high turnover, which is considered to depend on the unusually good employment opportunities for these categories.

IV. RESULTS AND EXPERIENCES

1. *Production*

It has not always been possible to follow the defined production schedule and there have been certain delays, inter alia because materials supply did not function satisfactorily. Owing to these difficulties, the pipe fitting department, for instance, which is one of the last in the production line, had to rely on overtime work to an unusual extent.

Where the initial stage can be regarded as completed, productivity has almost doubled in comparison with the period before the introduction of the piece-rates. Naturally the increase is not so high if the productivity is instead compared with the Gothenburg shipyard. The increase is due to many factors such as improved materials supply, completed adjustment of the equipment, etc., and no doubt the extra stimulus provided by the piece-rates.

2. *The workers*

The workers have easily adjusted themselves to the new conditions. A certain number left at the beginning, probably because they earned less than they had expected. Absenteeism has been lower than at the Gothenburg shipyard. According to information received, very few would consider returning to the old conditions, in spite of the generally somewhat lower earnings.

Apart from the differences in working conditions at Arendal, which have already been described, the main changes for the workers transferred there have been :

a) Better chances of upgrading.
b) New and more strictly defined working methods.
c) More specialised tasks.
d) Increased economic responsibility owing to higher capital costs per worker.
e) Cleaner jobs, inter alia owing to shot blasting of all plates.
f) Less risk of accidents.
g) A more objective and fair basis for the setting of wage rates.
h) Adjustment to new co-workers and in certain cases supervisory staff.

3. *The supervisory staff*

The centralised planning of work, combined with delays in the supply of materials, has been a source of irritation among the supervisory staff. (Here it should be pointed out that the intention was to enable them to devote more time to purely supervisory tasks by relieving them of part of their former duties.) The increased number of forms has also irritated them. On the other hand, they have better opportunities of promotion since there are more " staff functions ".

Their responsibilities have changed in a number of ways :

a) They have become more dependent on other departments and on a scheduled supply of materials, and more co-operation is therefore required.

b) They are no longer responsible for setting piece-rates.

c) The new piece-rate system makes it necessary for them to pay greater attention to the preconditions for production, so that materials and equipment are ready for the worker.

d) They find it more difficult to assign workers temporarily to other jobs, since different job evaluation groups are involved.

4. *Housing and transport*

The transfer to Arendal meant longer journeys for the majority of the employees. When the questionnaire was sent to all employees, 790 out of the 1,701 who did not wish to transfer gave this as their reason.

At an early stage the company entered into negotiations with the city authorities concerning a site for housing construction near Arendal but these have not yielded any positive results. The company did manage to secure the right to some flats and semi-detached houses, but the number was not very large, and the majority of the transferred employees have not been able to obtain a new dwelling closer to their workplace. The company also tried to organise an exchange of dwellings between its own employees and the employees of another major Gothenburg enterprise. Though this would have been to the advantage of both parties, these efforts have not been successful, probably because people are reluctant to leave the neighbourhood where they have come to feel at home.

As regards transport, the efforts of the company have met with greater success. The transport authority agreed to operate buses for the personnel between the centre of the town and the Arendal shipyard direct. In order to make it possible to estimate the transport requirements, the personnel department prepared a report describing the domicile, travelling habits, etc., of the employees. The present transport facilities are not quite satisfactory. A bridge across the Göta river, which is now under construction and will be completed in 1966, should provide the remedy.

5. *The Gothenburg shipyard*

The transfer of part of the production to Arendal will naturally mean certain structural changes at the Gothenburg shipyard, entailing some reassignments of the workers there. This is not expected to require any comprehensive retraining activity, nor to create other problems. Thanks to their good theoretical background, a large proportion of the workers will easily adapt themselves to other tasks. The probable decrease of the shipbuilding activity at the Gothenburg shipyard will create placement problems for some partially disabled persons.

VII. CONCLUSION

That the changeover was so successful, measured in high productivity, low turnover of personnel, low absenteeism, and a good atmosphere, is due to a number of factors :

a) The transfers have, with certain exceptions, been voluntary, so that only persons who were interested in the new plant were selected.
b) A great deal of care was bestowed on grouping the workers and supervisory staff into co-operative teams.
c) The company has endeavoured to create a friendly atmosphere and good working conditions.
d) The aim has been to avoid irritation, for instance, by currently giving the employees comprehensive information.
e) The company has constantly sought the co-operation of the employees' organisations and discussed all questions of importance to the employees with them.
f) The employees' organisations have, during the whole changeover, been co-operative and have actively supported the project.
g) A widespread pioneer feeling among the employees may also have contributed.

Case III

USE OF REDUNDANT EMPLOYEES IN A NEW PAPER-CONTAINER FACTORY

I. INTRODUCTION

1. *The firm and its location*

Iggesund, the centre of the district of Iggesund (population 7,000), has about 3,700 inhabitants, and industrial traditions of nearly 300 years' standing. It is situated in the northern part of the country, about 10 kilometres from the town of Hudiksvall on the Bothnian Sea. The dominant enterprise is Iggesunds Bruk, Inc., there is also a fairly new engineering workshop employing 35 to 40 men.

Iggesunds Bruk, Inc., was founded in 1685. Iron manufacturing was for a long time the most important trade, but during the present century the centre of gravity has shifted to forest products. At Iggesund the company possesses a pulp-mill, a saw-blade factory, and a paper-container factory, and at Hudiksvall a saw-mill. The company further possesses 250,000 ha. of woodland. At the end of 1963 the number of employees in this district was as follows :

Pulp-mills and paper-container factory	862
Saw-mill	570
Saw-blade factory	116
Head office	74
Forests	931
Others	137
Total	2,690

Due to rationalisation, there was a surplus of labour in the pulp-mills and a considerable surplus of forestry workers in 1962. In forestry, rationalisation had been so rapid that there were 200 to 300 redundant workers who had been fully employed two years earlier : they were all small farmers engaged in forestry work as a subsiduary occupation, many employed on an annual basis.

The industrial enterprises of Hudiksvall are the Iggesund saw-mill, an engineering workshop employing about 300 persons, a ski factory, a textile factory and some minor engineering workshops.

2. *Background of the change*

During the 1950 s the expansion in the world production of pulp made it less and less profitable to manufacture solely pulp. The company therefore decided to investigate the possibilities of further processing part of the output.

Extensive market research indicated that the consumption of high quality paper-containers would probably increase considerably in Europe during the 1960s, as had already been the case in the United States.

In 1960 the board of directors decided to build a factory at Iggesund to manufacture a food container for the frozen food industry. The main machinery was supplied by American and English firms. Construction began in January 1962 and the new factory started production on 26th August, 1963. The technical equipment was to some extent the first of its kind in Europe and the company had no direct experience of the new production.

II. INFORMATION AND CONSULTATION

At the works council meetings at Iggesund and Hudiksvall in September 1960 the Managing Director told the labour representatives of the company's decision to build a new paper-mill. The personnel magazine of the company, " The Crowned Anchor ", contained an account of the project, and a press conference was told of the plans which aroused much interest in the daily press. During the next three years, employees were kept regularly informed of progress through the works councils and the company magazine. Special attention was given to questions of recruitment and training.

The initial planning of selection and training for the new mill was assigned to a committee consisting of representatives of the employees and the production and supervisory staff. And the question of using selection tests was thoroughly discussed with the executive of the trade union before decision was reached.

Co-operation with the County Labour Board was recognised as important. In 1961 and 1962 the Director of the Board visited Iggesund and discussed the planning of the new factory and the employment problems created by rationalisation in the industries and in forestry. Contacts between the company and the branch office of the employment service have been frequent.

III. RECRUITMENT OF PERSONNEL

1. *Planning*

The construction work was to be carried out by a contractor, but the installation of machinery was to be done mainly by the workers who would be operating it.

In March 1962 a committee was appointed for the purpose of planning the selection and training of the personnel for the new factory. The labour requirements were at that time estimated at 81, of which 32 should be qualified workers. The workers were in the first place to be recruited within the company, i.e. from the pulp-mill, where the surplus was estimated at 61 persons, and from other departments of the company, mainly forestry. However, about 30 workers would have to be recruited externally in order to meet skill and experience requirements for the operation of the more complicated machines.

The committee did not anticipate any difficulty in recruiting workers from the pulp-mill, since the new factory offered much better working conditions and the content of the jobs would be more or less the same. On the other hand, the change from comparatively independent and free outdoor work to indoor work, constant supervision, and strictly prescribed working hours would require radical adjustments by the forestry workers. Furthermore, industrial work would entail quite different physical and psychological requirements. Continuous operation with four teams on three shifts was also bound to create adjustment difficulties.

2. *Advertising*

In June 1962 the company advertised for labour for the new factory in the daily press, and information about employment and training in the new factory was distributed to all employees in their pay packets. In July, the company advertised for foremen. By the autumn the following applications had been received:

Personnel from the pulp-mill	112
Applicants from other departments, mainly forestry	134
Applicants from outside the company, unqualified	187
Applicants from outside the company, qualified	46
Total	479

During 1962-1963 this number increased by over 100

3. *Selection*

The company decided to consult the Swedish Council of Personnel Administration (PAR) in order to make the selection more reliable through the use of tests.

After the customary information about the applicants had been obtained, an initial selection was made. The traditional policy of the company of avoiding taking labour from neighbouring companies governed this selection.

One hundred and forty-seven persons were tested at intervals during the period September 1962 to September 1963. The tests were the same for all applicants and were designed to give an idea about the applicant's general intelligence, technical knowledge and powers of observation. Moreover, each applicant had to write a brief account of his life including data on training, previous jobs, etc. This account was then used as a basis for an interview of about an hour's duration. It was hoped, in particular, that some notion of the ability of the forestry workers to adjust themselves to industrial working conditions could be gained from the interviews.

In making the final selection such factors as age, length of employment in the company, housing situation, etc., were also taken into account.

When the paper-container factory was put into operation the composition of the personnel was as follows:

Employees with previous experience of similar work	20
Employees from the pulp-mill	24
Employees from forestry or other departments of the company	24
Employees from outside the company without previous experience.	14

Workers without previous experience of similar work were recruited from outside the company because it was necessary at first to select people who could go on living in their old dwellings at Iggesund or at a reasonable distance from Iggesund.

In assigning the workers to jobs, regard was paid to the test results, technical ability, the teachers' and the foremen's impressions during the training and installation period, and the personal preferences of the applicants.

IV. TRAINING

After the management had studied the prototype of the machine in England, all foremen, engineers and the paper-mill foremen were sent there in order to improve their technical knowledge.

The task of planning training and of acquiring the necessary material was assigned to PAR. In January 1963 the training consultant came to Iggesund. His first task was to find out the categories of personnel for whom training would have to be arranged and the number of persons for each group. Interviews and job analyses made it possible to form an opinion about the basic knowledge that would be required of all workers. The supervisory staff was called together for discussions and for the selection of instructors, and two consultants from PAR led a seminar in training techniques lasting a few days.

It was decided to arrange a basic training course containing general information about paper-making, and the various types of machines used. This was followed by special training courses and practical training. The training time varied from 70 hours for, e.g., machine operators, to 4 hours for packing machine workers. More than half of the qualified workers were assigned a training time of between 30 and 70 hours. Workers also took part in the installation of the machinery, and in study visits and practical training in other factories in the neighbourhood.

As far as possible training was integrated with the construction of the factory, but it became necessary to cut down the training period in order to start production at the time determined.

V. WAGES

The earnings of the workers previously employed in the pulp-mill have remained more or less unchanged. Comparisons are difficult to make in the case of the forestry workers, since their earnings used to vary so greatly.

During the installation period the majority of the jobs were classified into two main groups. The hourly wage rate was slightly higher in one of the groups. Earnings thus depended on the type of the job to which a person was assigned. The externally recruited workers were paid a still higher hourly wage rate, a prerequisite for such recruitment. The trade union wanted to reduce the difference between the wages of the internally and externally recruited workers, since no one could claim previous experience during the installation period. Consultations with the management resulted in certain adjustments.

VI. HOUSING

The company planned housing construction with the local authorities who have begun to build new dwellings, but these are as a rule too expensive in comparison with the general rent level at Iggesund. The company tries to promote owner-occupation and provides advice and subsidies for prospective owners in addition to the generous government loans available for this category.

The housing question is particularly difficult for some of the former forestry workers who are used to the low rents of subsidised houses in small forest villages. They have to put up with long daily journeys or live separated from their families in lodgings at Iggesund.

VII. ADJUSTMENT OF PERSONNEL

Though production in the paper-container factory started only six months ago, it is possible to say that all categories of personnel have been able to adjust themselves to the new working conditions without much difficulty. This is reflected in:

a) A very low sickness rate in comparison with the sickness rate in the pulpmill.
b) An significant turnover of personnel. With the exception of one forestry worker, the few workers who have left were all externally recruited personnel.
c) A very low accident rate, which has furthermore been limited to harmless injuries.
d) The absence of breakdown in production.

The favourable results are ascribed chiefly to:

a) Good selection and training.
b) Improved general working conditions, better sanitary arrangements, pleasant recreation rooms for the personnel, etc.
c) The satisfaction of working with a new product and hitherto unknown equipment.
d) The satisfaction of the forestry workers, derived from fixed leisure time, not having to work under excessive pressure from piece-rates, and more even earnings.

The frictionless adjustment of the forestry workers is particularly notable. There were, of course, initial adjustment difficulties, but they seem to have been overcome, with the exception of one or two cases in which the workers have been unable to adjust themselves to the requirements of shift work.

Case IV

TIME LAG IN HUMAN ADJUSTMENT TO NEW WAREHOUSE METHODS

I. Introduction

This company, which is one of Sweden's largest merchandising firms, began its operations in 1899 in the form of mail-order sales. In 1931 its first Tempo store was opened at Ostermalmstorg in Stockholm, and there are now some 60 department stores scattered throughout the country.

With the constantly increasing turnover has also followed an increasing demand on the central stock facilities. By the middle of the 1950s, wholesale stocks had reached such proportions that special storage premises had to be rented. Towards the end of the 1950s, there were some ten different storage premises, totalling approximately 23,000 square metres, spread over the southern part of Stockholm. These sites had originally been constructed for completely different purposes and were generally antiquated and characterised by unsuitable floor-plans. Moreover, several of the warehouses were threatened with demolition. These circumstances rendered impossible the rational merchandise handling necessary for the firm's ability to compete.

The board of directors therefore decided at the end of 1960 to build a new, modern central warehouse in which all activities could be concentrated. Their aim was to achieve: speedier operation and better service to the department stores; lower wage-costs; increased storage space at lower cost; lower transportation and packing costs; and rapid customs inspection.

Since nearly a quarter of the Tempo department stores, as well as the head office and the buying departments, were located in Stockholm, there were strong reasons for the central warehouse to be located close to the capital city. The site would need to have good road and railroad connections, space for future expansion and for housing for personnel, and possibilities for new recruitment.

In 1961 such a site was found at Jordbo station in the Österhaninge municipality, about 20 kilometres south of Stockholm. Österhaninge had earlier been an important agricultural municipality with fishing and seafaring as its primary occupations, but now industries lead the economy. Some parts of the municipality offer attractive summer houses and sites for outings. At present the population totals 13,000, but this number is quadrupled during the summer.

In the middle of August 1961, the clearing and excavation was begun, and in October 1962, after a construction time of only about 13 months, installation commenced.

II. THE NEW CENTRAL WAREHOUSE

1. *The building*

The new warehouse is an exceedingly modern working-place, 200 × 200 metres square. It contains a light and pleasant cafeteria and, in contrast to the old warehouse, has large and hygienic personnel rooms with good washing and shower facilities and cloakroom space. Two sickrooms are also available.

The storage premises are built on a single level, without wall divisions, and with large spaces between pillars and good ceiling height. There are loading and unloading platforms on opposite sides of the building, with 8 metres of roofage, double railroad tracks and large driveways for trucks.

2. *Opération*

On arrival at the central warehouse the merchandise is loaded on to standard loading pallets which are used for all the merchandise handling inside the warehouse. It is then transported by fork lift truck or chain hauler to a storage place assigned in advance. So-called rolling frames permit the processes of storing or removal to be carried out completely independently of each other.

Every item stored has its own article number and receives a special storage location, which can be found through a location code of six numbers devised according to a simple co-ordinate system. These article numbers and location codes are reported to the head office's data department. When the department stores, on their assigned requisition days, send in their orders to the head office, the merchandise is listed by article number, and the data department sorts out the articles according to their location in the warehouse.

During packing, the selected merchandise is grouped together according to its destination. The goods then go to the weighing area where an automatic scale writes out the delivery slip, with the relevant data for despatch. Most of the goods to be despatched are set up on inclined roller ways, arranged according to destination, and, with the loading pallets placed upon simple flat-cars, they can quickly be shunted out onto the platform for loading.

The merchandise is despatched, as a rule, the day after the order is received at the warehouse. On the average 70 — 100 tons of merchandise per day (5 — 8,000 parcels) are despatched.

III. INFORMATION

The joint industrial council was informed in March 1961 of the decision to build a central warehouse. Running reports were made at every council meeting after that. In September 1961 an account was given of the investigation that the personnel department had undertaken with respect to the workers' willingness to move. At the same time a very comprehensive description was given of the whole warehouse project. The future manager of the warehouse gave a thorough report at the meeting in March 1962, and in September of the same year the chairman of the council announced the schedule for the moving of the wholesale warehouse. Further information was given through the unions to the other employees. Since personnel were spread over so many different working units, some practical difficulties presented themselves in keeping everyone informed.

The firm's first direct announcement to the employees was made in July 1961 by the personnel department, which sent out a representative to every wholesale warehouse to give a detailed account of the move. The representative at the same time distributed information sheets and the forms described in the next section. The personnel department afterwards kept the employees continuously informed about negotiations with the municipal authorities concerning housing, etc. Towards the end of June 1962, before it had been completed, the new warehouse building was thrown open for viewing, and this was repeated, with a running commentary, several times subsequently.

IV. MANPOWER ADJUSTMENTS

In July 1961 a total of approximately 140 people were employed in the 7 wholesale warehouses. A warehouse supervisor acted as chief in each of these warehouses. He had one or more assistant supervisors, and a number of stock workers — from 10 to 30, depending on the warehouse. At some warehouses the worker followed the merchandise from its delivery, through storage, to distribution.

Personnel requirements in the new central warehouse were estimated at approximately 120 people (management personnel, stock workers, office workers, etc.). The management of the firm wanted to get as many employees as possible transferred from the wholesale warehouses, but they were doubtful about how many would be willing to go to a place 20 kilometres outside the city, in a housing area which was only in the planning stage. The personnel department was therefore asked to find out the employees' attitude towards the move.

In July 1961 the personnel department distributed a form, containing 54 questions, to all the wholesale warehouse personnel. The results gave an indication of the numbers prepared to transfer, and showed that travel distance, attitude towards living in a suburb and shopping opportunities were decisive influences. Many of the employees were married and the majority of the husbands or wives had jobs in Stockholm, making removal difficult.

At this time there were altogether 140 persons employed at the wholesale warehouses. By the time of the transfer to the new warehouse the following had happened to them:

27 left before the transfer;
42 left in connection with the transfer;
6 were assigned to other jobs in the firm's department stores;
65 went to the new warehouse (including 6 of the 7 warehouse supervisors).

The future personnel manager for the central warehouse contacted the labour exchange in Österhaninge municipality as early as the spring of 1962, and through it later recruited a number of employees. But, of the 45 new employees eventually recruited, the majority consisted of other department store personnel who applied direct to the personnel office in Stockholm. By January 1963, when all the personnel had moved in, there were altogether 110 people employed at the central warehouse.

V. CHANGES IN SUPERVISORY FUNCTIONS

(The stock workers tasks have not changed appreciably in the central warehouse.)

1. *Warehouse supervisors*

The warehouse supervisors were the ones most affected by the change. They had previously been responsible for all aspects of storage activities within the wholesale warehouse. Their duties also included the inspection of stamp cards, the distribution of wages, and so forth. Furthermore, they handled contacts with the purchasing section and transporters, and supervised and delegated the work of unpacking, marking, storing and selecting merchandise as well as book-keeping etc. Their duties were extremely varied.

They have now become parts of a much larger working community and working organisation, and their duties are limited to one of three principal operations: traffic, segregation of stock, and unpacking of durable goods. Their work has thus become more specialised and more monotonous. Because it is more tied to routines, they do not feel the same demand on their initiative and ingenuity. Some like the changes. Others are strongly against them.

2. *Assistant supervisors*

In the wholesale warehouses the assistant supervisors had in the main the same duties as the warehouse supervisors in relation to the handling of merchandise, and took an active part in most of the tasks that came up. In the central warehouse they have functional responsibility for an area consisting of a varying number of merchandise divisions (such as, for example, textile goods) and they follow their particular merchandise right through from unpacking to stacking to selection. The functional division means that their duties are now under the functional supervision of various chiefs.

The assistant supervisor is called upon as soon as any problem presents itself in any of his areas. Since he is responsible for 4 - 6 "departments" and must also answer the telephone, send in article information, and so forth, his duties are extremely varied.

VI. FINANCIAL CONSEQUENCES

In the wholesale warehouses the assistant supervisors participated, as a rule, in group piece-work, but at the central warehouse piece-work rates have not yet been settled for this category. Compensation has been paid for lost piece-rate earnings and, on the average, the assistant supervisors have retained their former wage level.

For the stock workers the move, due to the difference in living costs, has meant that many suffered a decline in income. Before the piece-rates were set, the workers received a wage based on their earlier average income. The introduction of piece-rates at first lowered the wages of many. The group piece-rate was the most common type, and the economic loss was related among other things to the inexperience of the workers as well as to the high turnover of personnel. Time and motion studies are being carried on continuously, and the attempt is being made to offer the workers individual piece-rates, and, wherever possible, work in small piece-rate groups.

For the office personnel the move has not caused any appreciable changes with respect to finances.

A travel bonus of 55 Swedish crowns has been paid and is still being paid to those who travel to and from Stockholm daily. This amount corresponds directly to the travel costs.

VII. HOUSING AND TRANSPORT

The municipality did not live up to its promise of help with housing. Even one year after the installation of the new site only three flats had been supplied by the municipality to the firm's employees. The municipality also offered several co-operative flats on which a deposit had to be paid, but most of the stock workers could probably not take advantage of such housing without extra economic support. The company had expected to be able to offer conventional municipal housing to its employees, but the municipality considered that this type of housing should be distributed among all the different categories of housing applicants which a population expansion of 1,500 per year entailed.

Regularly scheduled bus services between Stockholm and Jordbro were infrequent and in December 1962, there were only 8 trips per day to Jordbro. The company tried repeatedly to influence the state-owned bus company to increase the frequency of bus trips and to situate the bus stops more conveniently for the firm. After a year's negotiations the number of daily bus trips has risen to 22. Moreover, the buses stop closer to the firm at the beginning and end of the working day.

VIII. RESULTS

During the first year of operation 13 of the 36 male workers who had formerly been employed in the wholesale warehouses left their jobs, as did 5 of the 18 female workers and one of the two female managerial staff. Turnover among the newly hired personnel was also high. Absenteeism was relatively high, at about 15 per cent among all employees.

This is thought to be due to a number of reasons. The quality of the recruits has not been up to standard, partly because male stock workers are a low-paid group, and partly because houses were not available for some existing employees who would have been an asset in the new warehouse. Training in the new operations has been inadequate for both supervisors and workers.

In addition there seems to be a common feeling of insecurity among all those who transferred from the old warehouse. They find the new workplace much too large and miss the more personal and individual atmosphere of the small warehouse. Because of changes in operation arising out of accumulated experience, they have had to readjust themselves fairly frequently to new routines. They have also had to get used to the functional organisation with a larger number of chiefs giving orders. Although it is difficult to determine whether there is actually a need for better safety measures, the transferred stock workers obviously feel that there is a greater risk of accidents, with the 30 fork lift trucks used for handling goods, and the three-wheeled scooters used by the workers themselves to move about the warehouse. Higher cost of living, long journeys and lack of opportunities for shopping add to the feelings of grievance. Many of those who transferred say that they did not receive enough information, even though employees were kept continuously informed.

The general conclusion is that the move was made too quickly and that many negative factors could have been avoided if there had been an opportunity for more detailed planning with experimental trials of various job routines, transport systems and so forth within the warehouse.

After one year's service the personnel are becoming more accustomed to the new situation and personnel turnover is not so high.

Case V

FLEXIBILITY AND CONTROL IN AUTOMATION OF TELEPHONE TRAFFIC

I. INTRODUCTION

The present report gives an account of the implications of automation for the telephone operators of the Swedish Telecommunications Administration.

The report is divided into two parts. The first part contains a general description of the planning of automation and the personnel policy followed. In the second part a short account is given of an actual case of automation, which can stand as a typical account of the problems encountered in connection with the automation of a medium-sized exchange.

1. *Administration*

The Telecommunications Administration, a government trading enterprise, is entrusted with the task of operating the telecommunication services of the country. The Board of Telecommunications is responsible for the central administration.

For the purpose of the telephone service the country is divided into six *regions.* The administrative centre of a region is called the *regional office.* For the technical services (e.g. building and maintenance) the country is divided into some twenty *sections.* The administrative centre of a section is called the *engineers' office.*

At a lower level there are about 80 *main-office areas.* The main office of each area is called the *central office.* There are as a rule three departments at each central office, a telephone department, an administrative department, and a telegraph department. Each central office further has a number of branch offices, called *minor exchanges.*

The *telephone department* transmits *local calls, short-distance calls* and *long-distance calls.* The directory enquiry service, the absent subscriber's service, etc., are also activities of the telephone department. The telephone operators of the telephone departments are called *telephonists.* They are paid according to the regulations determining the salaries of all civil servants in Sweden. All telephonists are women.

Only a small number of the manual minor exchanges are operated by telephonists. The other, called *contract exchanges,* are operated on the basis of a kind of tendering system. This means that they are handed over to a *minor-exchange manager,* who signs a contract with the Telecommunications Administration by which he assumes the entire responsibility for the operation of the exchange. He is obliged himself to employ such *assistants* as may be needed. The recompense of the manager will of course vary according to the size of the exchange. The operation of a minor exchange, mainly transmitting local calls, can in most cases be combined with other work, e.g. household work. Those who undertake to operate a minor exchange thus usually do so as a spare-time occupation and the assistants are often members of the family.

Altogether there are nearly 7,000 telephone exchanges. The number of telephones exceeds 3 million.

2. *Automatic operation*

Automatic operation involves great advantages for the telephone enterprise as well as for the customers. By eliminating human labour it reduces operating costs. It provides a rapid service day and night. Moreover, without it the speedy development of telephone traffic would have been practically impossible because of the difficulties of recruiting sufficient labour for manual operation.

The pace at which automatic operation can be introduced is determined by the availability of investment capital and labour for the necessary conversions. It must therefore be introduced by stages. The procedure followed when an exchange is to be automated is first to automate its local calls and short-distance calls, and then gradually the long-distance calls.

In Sweden automation began in 1924. During the first 25 years automation was generally limited to local calls, though short-distance calls, too, were in certain cases automated. Automation of long-distance calls did not begin until 1949. It will be completed when the last manually operated exchange is automated during the first months of 1970.

Even when all inland calls can be automatically transmitted, telephonists will still be needed for transmitting calls which customers do not want to have automatically connected, as well as for special services such as the directory enquiry service, the absent subscribers' service, and the emergency service. The number of telephonists required for such service will, however, be comparatively insignificant, and it will therefore be necessary gradually to concentrate them at a small number of junction points, or *service centres.*

3. *Conditions of employment*

In Sweden a civil servant on the ordinary staff is entitled to his normal salary even if his post is abolished. He is, however, obliged to accept transfer to another community or another permanent post. Persons on the temporary staff can be dismissed, e.g. if their posts are abolished, though the authority in question is obliged to investigate the possibility of finding alternative employment for them within its own field.

There are at present two salary-grades for telephonists: the lower for telephonists transmitting local and short-distance calls, and the higher for those transmitting long-distance calls. Promotion from the lower to the higher grade takes place as vacancies occur. The principle governing promotion is as a rule seniority.

II. CONSIDERATIONS IN PERSONNEL PLANNING

1. *Forecasting the personnel requirements*

The personnel requirements of telephone exchanges are calculated on the basis of the plans for automation. For each *central office* (and manually operated sub-exchange) general forecasts are made annually, showing the estimated personnel requirements during the next five-year period. Detailed forecasts covering a two-year period are continuously revised by each regional office. The forecasts show the estimated number of telephonists required for the manually operated traffic of the exchange in question, including the number of reserves needed for temporary reinforcement and to cover absenteeism.

2. *Normal wastage*

The turnover due to normal wastage is comparatively high among the telephonists. Experience shows that the proportion of this turnover increases with the size of the exchange. This of course facilitates the adjustment wher there is a gradual reduction in the labour requirements.

3. *Influence of personnel problems on the pace of rationalisation*

The advantages of automatic telephone traffic are so great that the availability of the necessary capital and labour alone should determine the pace of automation. This does not, however, mean that the consequences for the personnel are not taken into account.

It is technically possible to automate the local and short-distance traffic of a minor or medium-sized exchange and at the same time to transfer such manual operation as may be required — long-distance calls, the directory enquiry service, the absent subscribers' service, etc. — to a service centre. Such a change is economically suitable but accentuates the personnel prob lems At first the decisions on questions of this kind were made from case to case. Now the rule is not to transfer manual operation to a service centre if it is economically defensible for the time being to let it remain in the community in question.

III. INFORMATION AND CONSULTATION

The personnel are made aware of the employment consequences of each change at an early stage. The fundamental principle followed is to inform them of all facts of importance as soon as they are known by the management.

Locally, information is given by telling applicants immediately that they can only be offered employment for a limited period. They are also informed of the expected duration of the employment.

About two years before reduction is scheduled, the regional office arranges information meetings for the personnel. Information about future changes is given by the local management. Current information is given at the meetings of the works councils of the regional offices, and at the central level through the contacts between the Board of Telecommunications and the executives of the organisations representing the telephonists.

Several general measures to facilitate the process have in fact first been suggested by the employees' organisations. Where opinions have differed, disagreement has been related to the extent of compensatory measures contemplated, rather than to the adjustment policy as such.

IV. PERSONNEL REDEPLOYMENT

In considering the manpower problems of automation, the emphasis is on exchanges operated by telephonists. When contract exchanges are automated the manager and his assistants may be entitled to severance pay, depending on their length of service.

1. *Controlling the extent of redundancy*

During a certain time before each stage of automation, the staff is kept at the lowest possible level by not filling vacancies, and by having recourse to overtime, postponement of holidays, borrowing of personnel from other exchanges, and employment of temporary workers. The actual introduction of automation is sometimes made more gradual by such measures as transferring special traffic by degrees, or making use of half-automatic transmission for a period.

After automation, temporary measures are taken to absorb latent redundancy. Tasks are carried out which have been purposely postponed — for example, the training of personnel for special work. A liberal policy is adopted in granting leave of absence. Such practices give time for normal wastage to take effect and make it easier to adjust the number of employees to the number of available posts. In addition, early retirement is a possibility. Normal retirement age is low, 55 years. A telephonist aged 50 with at least 20 years service can be granted a pension in advance if the situation warrants it.

In most of the larger exchanges automation has in fact been possible without any direct measures for reducing personnel.

2. *Principles governing redundancy*

However carefully automation is planned, some redundancy is inevitable. The right to remain in service is in principle based on seniority.

Before automation began, the conditions of telephonists at one exchange were not influenced by the conditions at others. A person who for personal reasons wanted to be transferred to another exchange lost her seniority. This still applies. But where transfer is due to automation or other rationalisation measures, telephonists maintain their seniority.

It is sometimes necessary to retain telephonists with special training, while some with longer service but no such training become redundant. The general rule is to attach great weight to seniority in the case of routine duties, whereas for the more skilled jobs suitability prevails. Assignment to a job is governed by seniority only if the person in question has acquired the necessary qualifications.

3. *Finding alternative employment within the Administration*

When telephonists are expected to become redundant due to automation, they are offered a transfer to another job. In some cases it has been possible to transfer them to other posts in the same community or in the neighbourhood. In most cases a transfer does, however, imply removal to another community with its consequent personal problems.

The Telecommunications Administration has adopted the policy of offering senior telephonists who become redundant a free choice as to the community to which they want to be transferred. There are, of course, limitations to the free choice, dependent on such factors as the applicant's length of service in comparison with the length of service of the personnel at the exchange in question. The choice is also limited to larger exchanges.

Telephonists with shorter length of service — particularly those who were informed of the limited duration of employment when they were engaged — have no such choice. They must be assigned to the few major exchanges, in the first place Stockholm, which need more personnel.

The Telecommunications Administration on principle reimburses the costs for the transport of furniture, as well as the additional costs which cannot be avoided when members of the same household have to live in different places over a certain period of time.

4. *Finding alternative employment outside the Administration*

Some of the telephonists to whom it has not been possible to offer another job within the Administration in the same community, and who are unable to accept transfer to another community, may need assistance in finding other employment.

One of the tasks of the Swedish Labour Market Administration is to assist redundant workers in finding new employment and, if necessary, to arrange retraining courses.

The regional offices of the Telecommunications Administration at an early stage notify the County Labour Board in question of any automation which is expected to result in redundancy. The County Labour Board sends representatives to the information meetings in order to make known the functions and resources of the Labour Market Administration, as well as the steps employees must take if they want assistance in finding a new job.

5. *Retraining*

The Telecommunications Administration has for many years had a considerable retraining activity for reassignment within the administration. There are, for instance, very few employees in the administrative departments or the telegraph departments of the central offices who have not begun their careers as telephonists.

Retraining is as a rule provided in the form of on-the-job training, though centrally arranged courses for a region are becoming increasingly frequent. Efforts are being made to enlarge the scope of internal retraining activity. Telephonists have thus in some cases been transferred to jobs as drivers in telegram distribution and to purely technical jobs as repair workers at automated exchanges.

Training for transfer to other jobs is announced in advance, thus giving the telephonists who want to be considered the opportunity to apply.

As regards pay, the principle followed is that retraining and transfer to another job should not be allowed to cause economic loss.

The majority of the telephonists who are looking for employment outside the administration prefer office work. In order to help them find such jobs basic training in office work (typing, calculating by machine, etc.) is arranged for those who wish it while they are still in the service of the Administration. This activity cannot be regarded as retraining but is rather a preparatory, measure. However, typing has often proved sufficient training to enable a telephonist to get a new job, e.g. as telephone switchboard operator and clerk.

V. PROCEDURE FOR DEALING WITH PROBLEMS

The personnel problems were at first dealt with from case to case by the personnel department of the Board of Telecommunications, in consultation with the regional office in question. After sufficient experience had been gained, the Board of Telecommunications issued written directives on the personnel policy to be followed. These directives are continually revised so as to meet the requirements of development. The Regional Directors are responsible for the application of the directives.

Within the Board of Telecommunications the handling and supervision of these questions have been entrusted to a special official who is directly responsible to the personnel manager. The personnel manager of the regional office is responsible for the measures at the regional level, under the Regional Director. The personnel management representatives must of course continuously consult those responsible for the operation of the administration.

In order to avoid rigid bureaucracy and cumbersome reporting, and so as to stimulate the activity of the regional offices, central supervision is exercised chiefly through informal consultations with the regional management. This procedure makes it possible constantly to keep in touch with the requirements of development and to modify the directives on personnel policy to suit the situation.

VI. AN EXAMPLE OF AUTOMATION

This example represents the type of medium-sized central offices where manual operation cannot be retained.

1. *Planning and development of technical changes and traffic*

The manual installation at town A was of good quality. Automation could thus wait until more urgent needs had been satisfied, and was scheduled for 1961. A few of the about 40 contract exchanges belonging to the central office were already automated. It was found to be technically expedient to complete automation in four stages. Stages 1 and 2 were completed in October 1961 and 1963, respectively. The third and fourth stages are expected to be completed in the autumn 1964 and 1965, respectively. The remaining manual operation will then have to be transferred to a service centre.

2. *Labour forecasts*

The forecasted labour requirements were as follows:

NUMBER OF TELEPHONISTS
RESERVES EXCLUDED

	END OF YEAR					
	1960	1961	1962	1963	1964	1965
Forecast 1959	60	22	22	18	15	0
— 1960		22	21	17	10	0
— 1961			22	17	10	0
— 1962				17	10	0
— 1963					11	0

3. *Information*

The first information meeting for the personnel was held in January 1960. At that time there was a good balance between the personnel required and the number of telephonists, altogether 71. Their distribution as to seniority was as follows:

	ENTERED EMPLOYMENT, YEAR				
	1921-1930	1931-1940	1941-1950	1951-1957	1958-1959
Number	3	5	25	25	13

Almost 90 per cent of the telephonists entered employment shortly before their 20th birthday and the others in their early 20s. 47 of the telephonists were married. As from 1958 employment was only offered for a limited period.

The personnel were informed of the plans for the automation and the personnel requirements up to 1965 as well as of the expected requirement after the completion of stage 1. As regards the later stages, more detailed information was to be given when the requirements could be estimated with greater certainty. All telephonists who had entered employment after 1951, i.e. 34, were expected to become redundant after the completion of stage 1.

According to the County Labour Board there was a certain unsatisfied demand for office workers at town A. The representative of the County Labour Board was thus able to state that it would presumably be possible to arrange a course in office work (39 weeks) at town A immediately after the completion of stage 1, on the condition that a sufficient number of telephonists were interested in such training. Telephonists who would not become redundant until later would also be admitted to this course. The Telecommunications Administration offered telephonists employed for less than the required minimum period, leave of absence without pay for the duration of the course.

At a meeting in April 1963 exact information was given on the estimated labour requirements for the remaining period. The number of telephonists still in employment in April 1963 was as follows:

	ENTERED EMPLOYMENT, YEAR			
	1921-1930	1931-1940	1941-1950	1951-1957
Number	1	3	15	11

NOTE. The fact that there were still telephonists who had entered employment after 1951 is explained by the reduction in the higher age-groups.

The telephonists were informed that there would be employment for 25 of them after the completion of stage 2 and for 15 after the completion of stage 3.

4. *Details of manpower changes*

At the end of 1963 there were 25 telephonists in employment:

	ENTERED EMPLOYMENT, YEAR			
	1921-1930	1931-1940	1941-1950	1951-1957
Number	0	3	13	9

The number of telephonists who had left or been transferred since January 1960 was 46. Of these, 13 had been transferred, 12 had found employment elsewhere, and 21 had left for reasons unconnected with automation.

5. *Retraining*

In October 1960 training in typewriting was organised in co-operation with the vocational school at town A. 31 telephonists availed themselves of this training opportunity.

A sufficient number of telephonists applied for admission to the retraining course offered by the County Labour Board to make it worth while. The course was attended by 17 telephonists (11 from town A and 6 from exchanges in the neighbourhood).

6. *Measures to avoid recruitment of new labour*

There is normally a seasonal increase in traffic during the summer months (April to September). This is also the normal holiday season. A greater number of reserves are consequently required during the summer months than at other times of the year. The exchanges thus normally try to recruit new personnel in the spring. Normal wastage will then usually restore the balance during the winter months. Since stage 1 was completed in the autumn at town A these dispositions would not have solved the problem. During the winter 1960-61 training was arranged for housewives who were interested in temporary employment. They were recruited for the most part on the recommendations of telephonists who knew suitable persons. An appeal to the personnel voluntarily to postpone their holidays for 1961 till after the completion of stage 1 was answered with exceptional loyalty.

Case VI

ADMINISTRATIVE REORGANISATION OF THE SWEDISH STATE RAILWAYS

I. INTRODUCTION

This report concerns the manpower problems connected with an extensive administrative rationalisation programme within the Swedish State Railways, a nation-wide enterprise employing over 50,000 people. It describes organisational changes which will directly or indirectly affect nearly all the employees through changes in their working conditions and environment. It is not concerned with technological changes or a planned technical rationalisation process, though such changes are among the reasons for the reorganisation.

The report has been concentrated on an account of the regional reorganisation within the State Railways, although this reorganisation constitutes only a part of the total reorganisation project. At the time of writing, only a small part of the new regional organisation has been put into effect. The report cannot, therefore, give an account of the actual process and the problems arising out of it. It describes instead the situation from the beginning of the planning stage in July 1962 up to immediately before the process of execution two years later.

II. ORGANISATIONAL PLANNING

1. *Planning for the whole undertaking*

In general the reorganisation planning had to be carried out in two phases. It was necessary to draw up a general organisational scheme which called for an aggregate analysis of the functions of the enterprise and their relationships. Simultaneously with the aggregate analysis, detailed specialised studies of the activities of different organisational units were begun. The work was undertaken by an organisation study group.

The studies were carried out primarily through the use of interviews. The majority of the employees in the central units were interviewed. In the interviews the following information was ascertained:

a) the distribution of tasks among different employees;
b) the content of tasks in units of time and (if possible) quantity;
c) the relationships between different tasks and organisational units;
d) the classification of tasks with regard to quality, and possibilities for simplification or decentralisation.

In some areas particularly detailed investigations were made into office techniques.

2. *Planning at regional level*

The same methods were used here as described above. In the first stage. function and activities analyses were made, based on the available documentation, on interviews and discussions with unit heads, and on general experience This material was used for evaluating the regional geographical divisions and in general for distributing duties among the units. In the second stage a detailed specific analysis of the distribution of tasks among different units and a quantitative evaluation of the tasks was made. Here also, the interview method was used, combined in certain instances with job descriptions drawn up by the employees themselves.

Since there were about 1,700 employees in the regional organisation, not all of them could be interviewed. Two typical regions out of the five, and fifteen districts, were chosen for this purpose. Over 200 interviews were held.

Work on the material obtained was complete in the summer of 1963, and the detailed organisation plans, as well as proposals for work forces, were drawn up during the autumn.

3. *Description of the changes*

Previously, under the central administration (the Director General) there had been 5 regions, which carried on all the activities (operations, sales. supervision and some maintenance of rolling stock, building and maintenance of ways, building and electro-technical equipment). Each regional head had a regional administrative office with an expert staff for the planning of the region's activities. Below this office was the district level, in which the various branches of activity were divided up. The units were called sections and had geographical boundaries. In 1962, there were 88 such sections, also supplied with planning and supervisory staffs. The regional offices and the section supervisory officer were spread over 28 different communities and altogether employed approximately 1,700 salaried workers.

After, the reorganisation activities were divided up into two general groups. The one consisted of operations, including supervision and maintenance of rolling stock and transport service sales. The other covered maintenance and construction of railways and buildings, and electro-technical equipment. Thus, the previous regional offices were split in half, and their number doubled. At the same time the district level was abolished.

The result was the formation of 11 operations regions and 11 permanent railway regions. The heads of the operations regions were placed under the head of the central operations department, and the heads of the permanent railway regions under the head of the central permanent railway department. The boundaries of the two kinds of regions coincided and the regional head office shared the same location. The reorganisation on the regional level has not only entailed a geographical rearrangement of activities, but also a significant modification and redistribution of duties among different units. The delegation of decision-making power and decentralisation of certain duties from the central to the regional and local levels have augmented the changes.

Through the elimination of one level, the delegation of powers and decentralisation, and the simplification or abolition of certain jobs, it has been possible to reduce the personnel requirements in the regional administration from about 1,700 salaried employees to about 1,200.

4. *Timing*

On 1st July, 1963, two essential preparatory steps were taken. All the new regional heads were appointed in order that they might participate in the final planning. In addition, part of the activities of the regional level were transferred. The special permanent railways sections were placed directly under the head of the central permanent railway department so that they could later be absorbed into the new permanent railway regions.

The setting up of the new regions was planned to take place in three successive steps between April and October 1964. Even after all the regions have begun operations, there will remain the extensive work of adjustment, continued job simplification and delegating and decentralising measures. The reduction in personnel requirements caused by the reorganisation will not, therefore, be effected immediately, except in certain areas.

III. CO-OPERATION WITH THE PERSONNEL

1. *Contacts with the unions*

In the spring of 1962 — before the reorganisation study had been started — the employee unions were informed, through the central joint employee-management council, of the plans for the coming study.

As soon as the organisation study group had begun its work, the employee organisations were invited to appoint contact representatives to it. The duties of the contact representatives would be to follow the work of the investigation at information meetings and learn about proposals before any decisions had been made. Through these contact representatives, important information would be communicated to the employee organisations as early as possible. A number of meetings have been held between the contact representatives and the organisation group, and at an early stage the unions offered suggestions concerning the management's proposals.

After the new regional heads were appointed, the contact representative system was expanded. The employee organisations in each new region were asked to select contact representatives, who would receive information about the specialised planning chiefly from the regional heads.

The employee organisations have also had the opportunity to express official opinions on specific proposals, especially the original proposal for reorganisation. Before the Railway Board took any stand on this proposal, it was sent to the unions in an official announcement. Reactions were for the most part positive. The organisations have continued to express their opinions more or less officially on the subsidiary proposals that followed.

2. *Internal information activities*

The dissemination of detailed information, written as well as verbal, has been intensified during this exceptional period.

Three channels have been used for the distribution of written information:

a) via official circulars, notices, communiqués, etc.;

b) via the information service of the joint employee-management council;

c) via the State Railways' own personnel newspaper, and the unions' newspapers.

Three channels have also been used for the spreading of information verbally:

a) via each unit head in private conversations, at special conferences or in discussion-group meetings;

b) via the joint councils, whose officers have spread further the information there discussed;

c) via specially arranged conferences and meetings, at which the organisation group have given accounts of the organisational planning.

It has been noted that in some aspects the verbal information activities are superior to the written. Information can more easily be given verbally to the individual on those particular points that he is especially interested in.

The primary aim has been to make full use of all available means of communicating information about the reorganisation plans to the affected personnel. Thus, for example, the personnel were informed of the planned survey interviews and their purpose well before they took place. The unit heads sent personal messages to each employee concerned. The organisation group has participated actively in preparing the information material. At the central level, the personnel were called to a special information meeting after the studies had been made and the results had been examined. It has not been possible to do this at the regional level, since the plans were presented in a more general way.

The enterprise and the unions have co-operated effectively on the information question. Among other things, the unions in the central joint council have formulated constructive proposals for improved information activities.

In spite of this positive approach, it has not been possible wholly to avoid criticisms and dissatisfaction concerning information activities. A number of individual employees have asserted that information has been insufficient or has come too late. The main problem is to know precisely when the information should be given, and what information should be given.

IV. PLANNING THE LABOUR FORCE

1. *Preventing excessive surpluses*

Even during the first stage of the reorganisation work it could be expected that personnel requirements at regional level would decline, though this was not the primary aim of the reorganisation. A further reduction was caused by technical developments in the administrative area, among other things the mechanisation of various routines (e.g. use of EDP techniques).

In the autumn of 1962 it was estimated that the new organisation would entail a reduction of about 500 employees. Natural wastage would ease the problem but temporary surpluses could be expected. The State Railways Board therefore issued the following directives:

a) recruitment stoppage, beginning 1st December, 1962;

b) temporary stoppage of promotions to vacant positions in the highest salary grades from the same date; in addition, caution was recommended in promotions to so-called " doubtful " vacancies — for example, transfers to administrative localities that were to be eliminated;

c) recommendation that efforts should be made to increase departures at the beginning of retirement age among employees in the central and regional administration.

The final estimates for each office, along with the specialised organisation plans, were settled during September 1963. It turned out that the preliminary number stated in the autumn of 1962 agreed in general with the finally determined working force requirements, which amounted to some 1,200 positions for the regional administration.

Theoretically, then, the surplus of personnel should have been some 500, but it was already clear that natural wastage, the stoppage in recruitment, etc., had effectively contributed to reducing the real surplus.

2. *Job analyses and salaries*

Evaluations of the ability requirements for various jobs are in general difficult to make. Objective measuring methods seem to be scarce at present. Evaluations were necessary, however, especially since the coming salary negotiations required them. The survey material was useful in making comparisons between positions and tasks in the new and in the old organisation. This, combined with general experience, proved sufficient to assign competence requirements fairly precisely for the various positions.

The framework thus created then served as the basis for the negotiations between the enterprise and the unions on salary grade classifications. Since tasks and organisation were being altered, salary levels had to be reviewed. In addition, the conditions had been radically changed.

The main result of the negotiations is that the salary level in the new regional organisation is likely to be relatively higher than that in the old, although the increase has been distributed rather unevenly among individuals. Some have received salary raises and others have not. The amounts of the increases have also varied.

3. *Employee placement*

1,200 employees with varying competence, experience and salary levels had to be assigned positions in completely new organisational units, often with new combinations of duties. Removal from one locality to another was often involved as well. In addition, specifically expressed individual preferences concerning placement had to be taken into consideration.

In order to gain an idea of the individual employee's preferences, statements of preferred placement locality were solicited. This concerned primarily employees in communities from which the administration would be withdrawn. Out of 28 main administrative localities, only 11 would remain in the new organisational scheme.

On the basis of these preferences, as well as competence, proficiency, experience, etc., a preliminary selection of the personnel for the new positions was then made. For personnel in the higher career level the preliminary selection was made for all positions by personnel experts in the administration department along with the regional and central heads concerned. The results were announced immediately, and those positions were then declared vacant which could not be filled with employees in the corresponding or a higher salary grade. Everyone, apart from those preliminarily placed, was given the opportunity to apply for them.

For personnel in the lower career level the preliminary selection was made in the same way, except that they were given less opportunity to express placement preferences. Unfilled positions were declared vacant in order.

It has been questioned whether it would not have been better and more in accordance with accepted policy if all the positions had been officially declared open for application.

Both the enterprise and the unions thought it preferable that affected personnel should be informed of future placement as soon as possible. This was regarded as especially important, since the employees had become noticeably more uneasy about their positions during the last six months of 1963. A full-scale or partial application procedure would delay such notification for several months, as the number of applications would be very large and the formal system is rather complicated. In addition, it was thought wrong to declare positions vacant for which personnel in the appropriate salary grade were already available.

It was decided that an exceptional situation justified exceptional measures, and the simplified mode of procedure, with prompt notification of placement, was adopted. Most categories of personnel were given preliminary notification before the middle of December 1963. This meant that nearly all employees could be informed 3-9 months before their designated day of removal.

4. *Redundant employees*

As has been mentioned earlier, part of the estimated redundant labour force were reassigned even during the planning period. About 100 employees in the higher career level have not yet received permanent placement, and in the lower career level the surplus is calculated to be somewhat smaller.

Planning for the absorption of the redundant labour is carried on by the administration department's labour force section in co-operation with the regional units concerned. Attention has been concentrated primarily on offering permanent assignments to all personnel as quickly as possible. Those who have not yet received such permanent placement have been assigned temporarily to other offices as substitutes or as reinforcements during the adjustment period in the new regional units. None will have to be laid off or be without work in any other way. This has been made clear to the affected personnel from the beginning. Job security for these personnel is required by the conditions of employment. As civil servants, they cannot be dismissed for reasons of reorganisation.

Several general problems stand out:

a) A certain part of the redundant labour consists of employees who would be difficult to place even in normal conditions.

b) Redundant personnel have been placeable in the local units only on a limited scale, since there too a reduced need for certain administrative personnel is foreseeable.

c) Through a special survey, attention has been brought to the problem of female personnel because their placement involves special difficulties. The husband's employment often makes removal impossible.

d) Several special categories of employees are affected particularly strongly, since their activities have been cut down radically in the new organisational scheme. In such cases, individual retraining becomes necessary.

5. *Retraining*

Transfer in connection with the regional reorganisation as a rule involves no need for retraining of the affected personnel. General educational background and previous experience would seem to be sufficient for coping with the change in duties when administrative personnel are concerned.

In some employee categories, though, there is an increased need for specialised training. This need was present earlier, but it has been somewhat accentuated through the reorganisation. Some special training has, therefore, been planned, in some cases for groups, in others for individual employees.

V. PROBLEMS OF ADJUSTMENT

It should be pointed out that the effects of the reorganisation on the individual have not all been negative. For many the new organisation has been a stimulus and has had the effect of releasing potentialities.

The problems outlined below are based only on experience gained during the planning stage.

1. *Job changes*

It appears that most of the employees have been given a change in duties in some respect. This has happened through events beyond their control, and has undoubtedly produced uncertainty in some employees, particularly when accompanied by a heavy work load during the starting period. In addition, there are naturally feelings of insecurity among those who are temporarily redundant.

Some employees have maintained a critical attitude towards the reorganisation. They feel, for example, that they are in a category which has been hit harder than others, or that as individuals their status has worsened.

2. *Removals*

According to present plans, about 400 employees will be transferred to different communities under the regional reorganisation scheme. Nearly half of these have at the same time received promotions and increases in salary.

Some more or less general tendencies are apparent:

a) Salary seems to have influenced attitudes towards removal. If there was no increase in salary, reactions were less enthusiastic.

b) Opposition to removal to another community seems for the most part to have been weaker among personnel in the higher career level than among those in the lower. This may have a connection with the fact that recruitment to the two levels is different. Personnel in the higher career level in general do not work in their original home communities to the same extent as those in the lower career level.

c) Spare-time activities (e.g. community obligations, spare-time work) have in some cases hindered or prohibited a removal. This also applies, of course, when the wife works as well.

d) The kind of community from which the employee moves and to which he moves appears to have an important significance. This is particularly the case when employees are obliged to move from a coastal town to an inland community. Placement in a coastal town appears to be preferred.

e) Changes in working environment and in work duties do not seem to have had the same negative influence on attitudes towards removal.

3. *Housing*

Housing presents a special problem since the housing shortage in most of the larger communities is serious. It is more a question of comfort than of finance, since the employee who is without a dwelling in the new employment locality receives reimbursement for his increased living costs in the form of a so-called " replacement allowance " for a year after removal. The allowance is intended to cover completely the extra expense imposed on the employee. During the following three months compensation for double rent is given instead of the allowance. After that, the replacement allowance can, on special appeal, be extended for six months. At the end of this period there are still possibilities for compensation for double rent for nine months more. There is also compensation for removal.

In order to ease the individual's housing problem, the State Railways made contact at an early stage with those towns into which moves would be made. These towns have shown a positive interest in helping to arrange for housing for the employees who would be moving in. Employees in the majority of cases receive new dwellings at the time of their move or a few months after that. In some cases, houses have even been found before the moving-day involved. The State Railways has then paid the rent on the dwelling during the interval. In addition, some interest-subsidised loans can be arranged through the State Railways for employees who obtain dwellings with capital deposits in so-called " co-operative housing associations ". The housing problem is thus to a great extent solved.

VI. GENERAL OBSERVATIONS

The reorganisation described above has been particularly wide in scope. affecting nearly 4,000 employees in the central and regional administrations,

The fact that the reorganisation planning concentrated from the beginning on a rapid inquiry and a rapid execution appears to have been one main reason why problems have not been too serious. An extended reorganisation period would have produced greater disquiet among the personnel and reduced the effectiveness of the project. Experiences from parts of the central reorganisation substantiate this. For various reasons the reorganisation of several units had been delayed or extended in time, and in these cases disquiet was greater and disturbances more frequent — even though the changes were less profound — than in those units where the reorganisation was accomplished rapidly.

The aggregate planning has also been an advantage, if not a necessity. It has made it possible to analyse the problem as a whole and control it from a general standpoint.

Case VII

WHOLESALE SWITCH TO ELECTRONIC DATA BOOK-KEEPING IN SWEDEN'S POSTAL BANK

I. INTRODUCTION

On the first of April 1963 the Postal Bank in Sweden started to convert to electronic data book-keeping (EDB) in its savings account section. The following is a study of the preparations for and the completion of this reorganisation.

1. *The general organisation of the Postal Bank*

The Postal Bank has a common administration for its postal savings-bank and its postal cheque service operations, and constitutes a division of the General Postal Board.

At the end of 1963 the Postal Bank had 4,676 employees, of whom 421 were men and 4,255 were women. Personnel turnover is considerable; 1,200 people were engaged during the year and 1,388 people terminated their employment.

The number of postal savings bank books is 4.8 million. On these accounts 22 million transfers are made yearly. Deposits and withdrawals can be made at any post office in the country, and rural postmen also provide postal savings bank services. Furthermore, withdrawals can be made at a large number of post-offices in Denmark, Finland, Iceland and Norway.

The smaller post-offices in the country send daily statements of their postal savings bank transactions to their supervisory postal division. In this way the total number of post-offices from which the postal savings bank receives statements is limited to about 1,400. Work at the central administration in Stockholm includes the following activities:

a) Accountancy control of the post-office statements;
b) Computation of interest;
c) Book-keeping of the individual accounts and accountancy control;
d) Clearing totals.

2. *Competition*

A vigorous competition exists between the various savings institutions in Sweden. It is therefore very much in the interest of the Postal Bank to be able, through reduction of operating costs, to offer depositors improved terms. In addition, mobility in the sector of the labour market to which the Postal Bank belongs is very high. Difficulties in recruiting and retaining qualified personnel are considerable, and the improvement of working conditions for employees is important.

3. *Reasons for the conversion*

Until 1960 work in the central book-keeping section had been done with the help of card punch machines. The card punch machinery consisted of 60 keypunch machines and some 100 other card punches of various types. Troublesome backlogs could not be avoided in connection with year-end termination of accounts, interest changes during the year, and high volume periods connected with the summer holidays.

Moreover, the cardpunch equipment was about 15 years old and fairly worn out. New machine units of the same sort could not be obtained since they were no longer being manufactured.

A new office building was planned and it was important that any special requirements of a new type book-keeping system be considered in its interior design.

4. *Appointment of ADP group*

For these reasons a special working group was set up in March 1960 to study the introduction of EDB in the postal savings bank service.

The working team (the ADP team) consisted of a staff worker from the Postal Bank's organisation section and a supervisor from the savings division's book-keeping department who was familiar with the existing book-keeping system. It was responsible for the investigation preceding the ordering of the machines, for methods analyses, systems development, programming for the new book-keeping system, accomplishing the conversion itself, and for dealing with the organisational problems involved.

5. *Manpower changes*

Before the conversion, the book-keeping department employed 370 people. A reduction of 30 per cent was achieved fairly soon after the reorganisation, and further adjustments are expected to bring the number employed down to 170. Savings in manpower were also made in allied departments.

II. PLANNING THE CONVERSION

1. *Investigation of data systems*

The ADP team began its work by compiling a description of existing conditions. Working methods were, to a certain extent, already documented, but, where this was not the case, methods analyses were carried out and job descriptions made in co-operation with the employees affected.

Parallel with this, the members of the ADP team participated in systems and programming courses at various data equipment firms. They also made a study tour, visiting various postal savings banks and private banks in Western Europe.

In January 1961, the General Postal Board decided, in agreement with the ADP team's recommendation, to order data machinery of the IBM 1410 trademark. The delivery date was fixed for November 1962, when the new office building for the postal savings bank would be ready.

2. *Scheduling the planning stage*

Important technical advantages would ensue if all of the 4.8 million accounts could be converted at one time. This was possible, however, only if the conversion could be made in such a short time that the book-keeping work could be temporarily suspended without too great inconvenience. The simultaneous conversion for such a large volume of accounts obviously demanded special preparations in regard to methods development and retraining of personnel. It was therefore necessary to set up a detailed schedule for the various phases of the planning work.

3. *New premises for the Savings Bank office*

In order to create the best possible working conditions in the new offiecs, two rooms in the old building had been set aside for experiments with furnishings, flooring, lighting, sound-proofing, etc. The decision was made to abandon the earlier system of large working rooms and to create a more intimate and pleasanter working atmosphere. In the large working units this was accomplished through the building of half walls which would give a feeling of seclusion without at the same time making supervision difficult. Layout planning had to be done in one stage, since the ADP team could sketch the new book-keeping system only on a preliminary basis. Modifications in the layout plans therefore had to be made during the construction work. Since the building was constructed in such a way that walls are easily movable, further adjustments can be made without too much trouble if they become necessary.

4. *Testing of keypunch equipment*

One question which had not been answered when the data equipment was ordered was whether information should be fed to the machine via hole tapes or punch cards. During the year following the order, therefore, with the co-operation of experienced keypunch operators from the book-keeping department, various types of keypunch equipment were tested, and time studies were carried out. The operators' personal impressions of the different systems' advantages and disadvantages were recorded by the ADP team.

The combined results of the tests indicated that hole tapes were preferable from several points of view. Among other things hole tape punching required a shorter training period than card punching.

5. *New working desks for keypunch personnel*

The tape punches that had been ordered were a completely new product and no suitable working desks were available. An industrial physiologist was therefore engaged to determine how a desk should be constructed to offer the operator as comfortable a working place as possible. A desk was constructed which could be adjusted in both height and width, and an operator worked at it under different conditions while muscle tension in shoulders, arms and wrists, etc., were measured. On the basis of these experiments a keypunch desk was constructed. The keypunch personnel were consulted on the question of drawers, handbag compartments, etc.

6. *New forms*

The changeover to data book-keeping involved a revision of practically all the forms which were used in the postal banking service. The forms to be used by the public, cashiers, and personnel in the Postal Bank, primarily keypunch personnel, were the subject for discussions and adjustments between representatives for the cashiers and the ADP team.

III. INFORMATION

Reference has already been made to the part played by employees in describing existing conditions and in reaching decisions about new keypunch equipment, desks and forms. They also made many suggestions about the new premises.

During the preliminary study, announcements were made at the joint management-employee council. After the decision to purchase the new machines was made, the employees in the Postal Bank were told, via loudspeakers and later via the personnel newspaper, about the decision, its basis and how the entrance into the " data age " would probably affect working methods. Running information activities were continued in various ways up to the date when the new book-keeping system had been completed. The ADP team inserted repeated notices about the progress of their work in the Postal Bank's internal monthly information publication. Moreover, at an early stage two reprensentatives from the women's supervisory group were chosen to act as liaison between the ADP team and the two departments to which they belonged, the book-keeping department and the accountancy control office. In order that they should understand the patterns of thinking in the ADP team's systems proposals, they were given the opportunity to go through a complete programming course. They did not, however, become members of the group but continued working the whole time in their respective departments.

During the course of the systems work, the ADP team repeatedly went through its preliminary proposals with the departmental supervisors concerned as well as with those responsible for affected sections within the departments. Moreover, an account of the preliminary systems development was given to supervisors in connection with an orientation course on EDB.

Several months before the beginning of the conversion, combined information meetings for all personnel who were to be affected by the changeover were arranged; one for the book-keeping department and the accountancy control office, and one somewhat later for the checking department which would also be affected to a significant extent by the changeover. The gatherings were divided up into two portions: one two-hour long obligatory information meeting during office hours, and a subsequent entertainment. At the information meetings, as well as in the announcements of the data machine order, the management emphasised that no one should be concerned about loss of employment due to automation, although everyone should be prepared for a partial or complete change in job content. The technical information included a short description of the data equipment and a rather detailed explanation of the whole working cycle. Slides, a flannellograph, etc., were used as illustrative material, and booklets containing examples of various kinds of lists, punchcards, etc., were distributed. The audiences were given the opportunity to ask questions.

During the period coinciding with these information meetings a conference was also held with the Postal Bank's joint management-employee council at which a thorough presentation of the data equipment and the systems development, including a tour of the equipment location, was given. Once the system had been tested on authentic material, the ADP team worked out an organisation plan for the book-keeping department. This was distributed to the employee organisations and was on several occasions the subject of discussions between them and the Postal Bank.

IV. TRAINING

Training has been conducted on two lines: a general introduction to electronic data processing, and special training for the various new jobs.

1. *Introductory course*

In order to give the department supervisors and their closest co-workers in the Postal Bank some ideas of the advantages and possibilities offered by electronic data processing, a special introduction course was arranged, in co-operation with IBM, at the Postal Bank. It was held during working hours, and included a description of the type of machine that had been ordered, examples of its uses, a description of programming methods and an explanation of its applications to pass-book accounts book-keeping. Department supervisors from the savings office's book-keeping department and the accountancy control office went through additional EDB courses.

2. *Training of programmers*

Especially in the case of programmers it was necessary at a relatively early stage in the preparations to select suitable personnel and begin training. It was important to relieve the two system developers of at least a part of the coding work.

Two female employees were selected for training. After they completed their course they were attached to the ADP team, and as a beginning were assigned to coding programmes for which the flow charts had already been drawn up. Gradually they worked out increasingly complicated programmes more independently.

3. *Training of operators for the control data office*

Since the data machines would have to be run on two to three shifts during the conversion period, the aim was to train 10 or so console operators in order to have reserves in case of absences. A good while before the machines were scheduled to be delivered, four of those who had done well in the aptitude tests for head operators and tape librarians were selected and went through a complete programming course.

After the machines had been delivered, a special course was arranged in the central data office, partly for the prospective head operators and partly for the six other people who had been selected to become assistant console operators.

Four employees from the book-keeping department were chosen as card punch operators. The intention was that the card punch operators would eventually be trained as console operators and, when needed, act as substitutes in these jobs. The prospective card punch operators went through courses for the different machine units.

Two salaried employees from higher levels were selected six months before the delivery date of the data equipment for the direct supervision of work in the central data office. Both took part in the programming and in various card punch courses. They participated together in the planning of working methods in the new central data office.

4. *Training of personnel in the book-keeping department*

The first training in the book-keeping department for the new system concerned keypunch personnel. They had to obtain enough practice in hole tape punching so that they could switch to a completely different keypunch system from one day to the next at the time of the conversion. About six months before the conversion a course was therefore organised for hole tape punching, with the ordinary keypunch group supervisor as instructor. All of the operators, some 80, practised as long as was necessary for them to reach approximately the same working rate as they had had on the card punch machines. During the days immediately preceding the conversion each operator went through a short repetition course.

Another keypunch training course took place concurrently with the instruction in hole tape punching, partly on card punch machines and partly on book-keeping machines with card punches attached, since in certain operations punchcards were to be used. One of the supervisors in the book-keeping department's keypunch group was used as instructor. Altogether more than 10 operators were trained.

Training for the rest of the personnel in the book-keeping department was begun about three months before the changeover. By this time old authentic material had been set in order for a trial of the system on 120,000 accounts that had been transferred to magnetic tape. This "trial run" lasted for two months and served training aims, as well as being a rigorous test of the data programme. Every supervisor in the various sections of the book-keeping department worked during this time with the practice material, according to the preliminary method scheme worked out by the ADP group, until they had become fully familiar with the system. The two " contact women " described earlier acted as instructors, since by this time they were conversant with the new working methods. In co-operation with them and with the supervisors, the methods scheme to be followed by the personnel in the various sections was finally adjusted and determined.

The group heads who had thus become acquainted with the new system then had to instruct in detail and train their subordinates in preparation for the conversion.

All the training took place during ordinary working hours. Wherever personnel were freed from their duties in order to act as instructors, substitutes were provided.

V. MANPOWER PROBLEMS

1. *Reassignment of personnel*

It was clear from the beginning that the introduction of EDB would result in reduced personnel requirements, especially in the book-keeping department. There the reduced requirements would primarily affect personnel occupied with purely routine tasks. Within this category, which consisted principally of younger employees, the number leaving had been large for a long time and the reduction of personnel could be accomplished through a temporary stoppage in new recruitment.

For the middle level, people who had been employed by the bank for several years and were doing more qualified work, some jobs were also expected to be eliminated, though to a lesser extent than for the younger category. Because of this, personnel for the new central data office were selected primarily from this level. Another attempt was made to reduce this category through offering first to them any new openings for qualified employees in other departments.

The need for supervisory personnel was expected to shrink in proportion to the reduction of personnel strength in general. In order to ease the problem, vacant posts had not been filled permanently but were instead held through temporary appointments. Moreover, at a later date, promotions were made only for a limited period.

At one point the hiring of new personnel with previous knowledge of EDB was considered for the job of programmer. There was, however, strong competition on the labour market for this category, and besides, experience in the previous working methods was considered valuable. It was decided therefore that the selection should be made from the bank's own personnel. Employees from all of the savings offices' sections, a total of some 1,000 people, were invited to take a psycho-technical test. Some 90 applied for and took part in the test. On the basis of the test results and previous knowledge of those concerned, two programmers were chosen. The test results were also used in selection for certain other ADP posts.

Some time before the conversion, the head of the book-keeping department was freed from routine work to prepare for the new organisation by assigning employees to the new sections of the book-keeping department.

2. *Temporary increase before and during conversion*

In order that the book-keeping of pass-book accounts could be as far ahead as possible before the starting date, and in order to compensate for the absence of employees who had been assigned to practice in the new jobs, extra recruitments were made during the autumn of 1962. Most of the newly recruited personnel later became superfluous in the book-keeping department and were transferred to other departments, some permanently, some temporarily.

A large staff to clear totals and make corrections was required during the actual conversion period of about one month. This work was supervised by the two liaison representatives and was executed by all the available personnel in the bank's book-keeping section who were not required for routine work such as mail sorting, keypunching, etc.

As expected, there was no question of a reduction of employment requirements during the period immediately following the changeover. A number of complications arose, among other things due to inadequacies in the equipment and unexpected errors in the programming. Before this could be remedied, considerably more work had been produced. Personnel earlier loaned out were called back, and extra workers were engaged during the summer as a temporary reinforcement.

3. *Final reduction in personnel strength*

The backlog in the work had been completely overcome by the beginning of November, and at the same time the move could now be made into the new office building. The necessary reduction in personnel was made chiefly through assigning the younger " mobile " employees to other departments permanently. Recruitment of new employees to the book-keeping department had completely ceased. In the central data office the personnel strength had been reduced through " natural " departures.

The only real personnel problem has been the reassignment of a handful of salaried employees who had previously supervised groups. Their tasks had now been completely taken over by the data machines. They have been placed in positions which do not correspond fully to their service grade.

VI. RESULTS

Detailed time schedules, active participation of the employees concerned, and thorough advance training contributed to the smoothness of the conversion.

Besides the reduction of personnel costs, the changeover has eliminated troublesome backlogs in the book-keeping work. The fact that an interest change, which used to take 7 weeks for the book-keeping department to complete now takes the data machine only 7 hours, is an example of the rapidity of the new book-keeping system. Moreover, the conversion to EDB has made possible statistical studies and analysis which were impracticable under the earlier working methods.

For the personnel, work at noisy card punch machines has been eliminated, and monotonous routine work has been taken over by the data machine. In addition, the move into the new office building has brought with it a considerably more pleasant working milieu, and has probably contributed to producing positive attitudes towards the conversion.

Chapter VII

UNITED KINGDOM

INTRODUCTION

Each of the six case studies for the United Kingdom relates to a separate industrial setting: coal mining, cotton textiles, dyestuffs, engineering, hose manufacture and steel. One deals with the programme and experience of adjustments to economic and technical change in a nationalised industry while the others present developments in single, privately-owned plants, generally part of larger organisations. The units vary as to size, number of workers affected, and nature of the change. Most of the studies present illustrations of the modernisation of an existing unit or plant. Two relate to the closing of units and a merger of operations. In all cases there is considerable shifting of existing personnel to new jobs, often radically different from those in the former operations. There was geographical relocation only in the case of the coal industry. There was a net reduction in personnel in two of the cases, no change in another, and actual expansion of employment in the other three.

These studies were made by the Industrial Relations officers of the British Ministry of Labour in co-operation with the managements of the plants and after conversations with employer representatives, trade union officials and employees. Miss Joan Woodward of the Imperial College of Science and Technology, adviser in social studies to the Ministry of Labour, assisted in this project. The investigations followed the outline provided by the OECD Social Affairs Division " Guides for Case Analysis ". The field work for these studies was carried out in 1963 and 1964.

The changes reported in the case studies were made after close study by a management group considering competitive and market factors. In many instances, the continued profitability of the enterprise or unit depended on these changeovers. In all instances, special management committees prepared the feasibility tests, final plans, and time schedules for the installation. In several cases, operations were concurrently maintained or production had to be transferred smoothly from old to new units to enable the companies to continue to supply their customers with traditional products. In both the coal and cotton textile cases, some production units were maintained for personnel reasons. These careful plans allowed for the smooth implementation of the programmes.

Manpower requirements were carefully worked out in the course of the scheduling of the technical changes. The assessment of manpower needs was done either by the technical planning group itself, or a sub-committee which usually included the personnel or industrial relations officers and occasionally representatives of the works councils or union. The manning schedule was built generally upon experience in other plants, careful study of the flow process and job descriptions or analysis. The projections set forth the numbers of workers, rates of pay and working conditions and, in some instances, also the training schedules. In one plant, the advice of the safety department was also obtained in order to assure the safest operating conditions and methods. Since the new jobs were often substantially different from those which were being replaced, training materials or programmes had also to be devised to prepare for the effective employment of employees after transfer or recruitment.

In all instances, manpower planning was done considerably ahead of the time when the changes were put into effect so that formal policies could be devised, assurances concerning future jobs given to the employees and agreements reached with the employee representatives. Advance planning also provided management with guides for dealing with the problems of delays in the delivery of machinery and adapting their plants to unexpected operational difficulties.

The common principle running through the plans was to minimise the displacement, find appropriate and equivalent employment for present employees and keep hardships to a minimum. All the firms either offered guarantees of employment or assurances against redundancies, although in practice some individuals were ultimately displaced or left of their own volition. The companies relied principally upon normal wastage to account for a considerable number of the displaced employees. This form of adjustment was of less importance in these cases than is usual where contraction in jobs is common, because of the prevailing shortage of labour and the expansion in employment. Nevertheless, the introduction of new machinery was often timed or production of established units was continued to minimise the displacement or to arrange for it to occur at a period when absorption both within the plant or in the general labour market would be easiest.

The second major adjustment principle was that of controlling the entry of new recruits to ensure absorption through the transfer of the existing work force. The latter were generally offered the first opportunities for new jobs even where they differed considerably from the previous ones. They were invited in most instances to volunteer for employment and selections were often made on the basis of the judgment of the operating management rather than through formal testing procedures. The National Coal Board controlled recruitment, keeping in mind its wastage rates, by giving preference to displaced employees, those who had recovered from injury, and the young, but the number of recruits was tied in closely with a programme of coal stock building to permit the smooth functioning of all personnel policise.

A number of other devices were also used for controlling the impact of the displacement. The coal industry abolished Saturday work. The steel company secured an agreement with the union for more liberal overtime and the employment of temporary men. Other companies arranged for the transfer of men to temporary assignments. In the coal industry, where the case report dealt with a wider geographical area, provisions were made for transportation, lost time payments and housing those who had to transfer to other locations.

The above programmes plus the careful timing of changes helped to keep the number of redundancies to a minimum. Where they occurred, assistance was given to employees to find alternative jobs in the community by supplying references as well as paid time off for interviews. Severance pay was given on the basis of length of service to those who had no employment and in some instances to those who secured outside employment. Pensions were paid to some employees of 65 years and over. In the cotton textile industry displaced employees secured severance benefits under the Cotton Industry Act. Because of advanced planning, there was sufficient time to allow for individual choice and adjustment.

The concerns were mindful of the effects of the change on employees' earnings. Guaranteed earnings during the change were common. In the cotton textile case, the cost of these guarantees was met from the funds collected under the Cotton Industry Act. Managements were reported to have carefully considered the relative levels of wages between the old and new jobs before transfers were made, so that they were in most cases either on a par or somewhat higher. Some job promotions were made, particularly where there was an expansion of the work force. Some downgrading occurred and caused discontent.

The firms generally undertook their own training of employees. This was invariably done on the job after careful analysis of the work itself. The operating people were given training in methods of instruction. For key operators and staff, visits and study in other plants, even in overseas countries, were arranged. Outside training facilities were used for some theoretical training and specialised jobs such as computer programming. The steel company built simulated equipment for training operations.

The outstanding characteristic of the above programmes has been the careful planning and deliberation associated with the introduction of the changes, the subsequent programming of manpower changes and the adjustment provisions. They were all integrated to achieve a unified effect both to assure the effective use of the existing manpower and to win the support and confidence of the work force and maintain their feeling of security to the greatest possible extent.

Many factors contributed to the careful planning and caution reflected in these programmes. Some are economic, since in most instances the changes were instituted to meet competition and assure the viability of the enterprise. In addition, the accent throughout these cases has principally been upon maintaining close contact with the employees and their representatives and working out ahead of time the detailed agreements on adjustment with the works councils and unions on the many subjects in which they have a direct interest and which have been governed by previous bargaining arrangements. The managements stressed the need to maintain good industrial relations records. They therefore invariably, and at a very early date, informed the works councils, joint productivity committees, union representatives, and employees of the plans. They provided them with the rationale and the facts supporting the need for action and the outlines of the new arrangements. They were very responsive to suggestions and representations and negotiated on wages and seniority transfers, shift work and other aspects of employment. They consulted them on manning, redundancies, and other phases of the planning effort. Company and plant officials made a considerable effort through publications, conferences, large and small group meetings, personal letters and individual interviews to provide information, discuss problems, answer questions and correct unfounded rumours. Notices and consultations were arranged long in advance of the actual change so that the adjustment could be rationally met and individual cases dealt with in full consideration of all interests.

Case I

PLANNED RUNDOWN OF COAL INDUSTRY'S LABOUR FORCE

I. INTRODUCTION

1. *The industry after nationalisation*

When the National Coal Board took over control of the coal-mining industry of Great Britain on 1st January, 1947, there were nearly 1,000 pits and a variety of other undertakings employing over 750,000 people. The industry had been suffering for many years from the lack of capital investment, the depression, high unemployment and bad labour relations of the 1930s, and the chronic shortage of manpower and output during the war years.

A programme for the future reconstruction and development of the industry was needed. In 1950 the National Coal Board published " Plan for Coal "; it was a flexible plan based on the assumption that demand would increase in the foreseeable future. In the early 1950s capital was invested on an ever-rising scale. The plan was revised in 1955, allowing for the fact that schemes would take longer than originally envisaged. The short-term need for coal at virtually any price required amongst other things, the continued working of uneconomic pits. Therefore at the beginning of a period of profound technological change, industry's short-and long-term needs were in conflict and its efficiency was affected. Because investment in an extractive industry matures slowly and is basically speculative, benefits through higher efficiency are not quickly apparent.

At this time there was no question of mechanisation involving any rundown in manpower. The Board's first priority during the period of constant manpower shortage had been maximisation of output. From 1947 to 1957 colliery manpower fluctuated about the 700,000 mark but showed a slight upward trend. In 1956 it was stated in the Organisation for European Economic Co-operation's Report entitled " Commission for Energy ", that coal was likely to be the mainstay of Europe's energy requirements for many years to come. The 1955 National Coal Board review of the " Plan for Coal " provided for an output of 240 million tons in 1965 and 250 million tons in 1970, implying a manpower build-up from about 700,000 to about 750,000.

2. *Changed circumstances of the industry after 1957*

Towards the end of 1957 the picture began to change, mainly because of:

a) increase in use of other sources of energy, especially oil,

b) a generally lower level of industrial activity,
c) much greater efficiency in the use of coal.

Output in 1957 was 222 million tons (deep-mined and open-cast); this steadily fell to 188 million tons in 1961. The demand for coal fell by 33 million tons between the end of 1956 and the end of 1959. For the first time the Board was faced with a need to deliberately run down manpower and this meant a profound change in the manpower policies, which for over ten years had been to recruit within reasonable limits anyone who came forward for employment. Though demand picked up significantly after 1961, the increasing pace of technological change and the rationalisation of the industry meant rapidly rising productivity and, therefore, a continuing need to reduce the industry's labour force.

It would be difficult to isolate the effect of " technological change " in the limited sense of manpower rundown and redeployment but, broadly speaking, the changes in manpower which have taken place stem from the modernisation of the industry, whether this be in the form of closure or reorganisation of uneconomic units, or development of new pits and new machines.

3. *Mechanisation and increased efficiency*

By 1957 it was clearly essential that the efficiency of the industry be raised so that it could remain competitive in the new situation. Between 1947 and 1963 work started on some 300 major projects, 29 of these being new pits or major drift mines. There were also numerous other minor projects and small drifts, and many new machines and accompanying techniques were developed. By the late 1950s the effects of the plans for the major reconstruction of the industry laid in the early days of nationalising the coal industry began to be felt, and this was the background which compelled the industry to radically run down and redeploy its manpower.

The results, in very broad terms, of the technological advance of which the industry was able to take advantage, have been:

a) over half the Board's deep-mined output now comes from collieries which have been sunk or reconstructed since the war, many of them equipped with machinery. This has made it possible for older and inefficient collieries, kept open because of the former coal shortage, to be closed;
b) there has been increased concentration of production at the best faces and multi-shift working to take advantage of technological advances and new machinery. (Method study has helped in the drive for maximisation of efficiency and has contributed to more exact forecasting of manpower requirements);
c) in 1956, 15 per cent of colliery output was cut and loaded by machine; in 1963 this had increased to nearly 70 per cent;
d) in the period 1956-63, productivity, measured by output per manshift, rose by one-third.

4. *Manpower in the industry*

At the end of 1957 when the need to run down, redeploy and organise the industry's labour force became evident, the Board employed some 810,000 people; about 705,000 at collieries (including some 45,000 under-officials and 55,000 craftsmen), a further 50,000 managerial, technical, professional, administrative and clerical staff, and about 50,000 others (including brick-workers, coke oven workers, building estate workers, farm workers, etc.). By the end of 1963 the number employed in the industry had been reduced to about 605,000, of whom just over 510,000 were employed at collieries,

The age distribution of the total labour force of 704,000 on colliery books; excluding under-officials and craftsmen, was approximately as follows in 1957:

AGE GROUP	PERCENTAGE OF TOTAL LABOUR FORCE	APPROXIMATE NUMBER ON COLLIERY BOOKS
Under 18	5.0	35,000
18-20	5.9	41,000
21-30	17.6	124,000
31-40	22.4	158,000
41-50	22.4	158,000
51-60	19.4	137,000
61-65	4.9	34,000
Over 65	2.4	17,000
Total		704,000

II. MANPOWER PLANNING

1. *Controlling the rate of manpower changes*

Despite the additional costs borne by the Board it was necessary to plan a gradual run down because of its social obligations as an employer in a nationalised industry. It was also necessary to avoid friction which might affect the introduction of mechanisation at a time when the advantages of its increased efficiency were becoming noticeable.

The reduction in manpower has been spread over a long period (and it is continuing in this way) so that the change has not been too great at any time or in any place. The process of readjustment could have been achieved at a faster rate (between 1957 and 1963 there was a reduction of over 190,000 (27 per cent in colliery manpower and a further 15,000 in the number of other employees), but the curtailment of productive capacity by closing pits down too soon and consequent large scale redundancies would have had serious social and economic repercussions. (A fall in coal sales in the inter-war years was met by dismissals on a vast scale with resultant bitterness and a legacy of bad labour relations). The rate of change has had to be controlled and the labour force reduced more slowly than trends in demand and productivity suggested, and this has inevitably resulted in some stocking — in the years of coal shortage, stocks were rarely more than four or five million tons, while at the beginning of 1960 they were 36 million tons.

2. *Methods of control*

In planning manpower it is necessary to decide what manpower change is desirable and what is possible. The two basic factors in planning are productivity and demand, and only when these have been established can the labour force needed at any given time be calculated. Room for manœuvre is limited by outside influences largely beyond the industry's control, such as the level of economic activity, geological conditions and social needs. If the economy is buoyant, coal-mining labour is scarce at a time when it is needed, if the economy is sluggish, and there is little demand, coal-mining is more attractive to labour.

However, requirements can be planned ahead and changes anticipated, and the Board's main tools in carrying out its plans are (1) control of recruitment, and (2) timing and extent of closures. The comparatively high wastage rate within the industry (about 10 per cent per annum on average) is a factor in the Board's favour. Certain types of wastage can be closely forecast, e.g. from deaths, retirements, accidents, etc., and an attempt can be made, from past experience, to forecast volontary wastage, which, though beyond the Board's control, can usually be related to such factors as local economic conditions, past and future prospects and the availability of alternative employment.

3. *Use of recruitment priorities*

Wastage has fluctuated, in a single year, from about 55,000 to 95,000, but it has tended to average about 60,000 per annum. Therefore, the rate of rundown can be regulated by strict control of recruitment, and for a number of years the Board has exercised basic recruitment priorities. Broadly speaking, preference is given to juveniles, craftmen, ex-sickness cases to whom there is a re-employment obligation, and men displaced by closure or reorganisation elsewhere. After these categories come re-entrants and adult recruits new to the industry. The emphasis placed on the restriction of various types of recruitment has changed from time to time according to need, e.g. at some times and in some places adult recruitment of all sorts has been almost entirely curtailed.

In an average year the Board might expect to recruit perhaps 130,000 juveniles, 4,000 ex-sickness cases, transfers from Board employment other than coal-mining, ex-redundants (i.e. men to whom there is a strong re-employment obligation), and about 1,000 new craftsmen. Thus, if wastage is about 60,000, the Board has a margin of perhaps 40,000+ within which to exercise control of whatever manpower rundown is necessary. Within this total some areas would want to more than replace wastage, others to just replace wastage, while others would only recruit those to whom there was an obligation and the minimum number of boys necessary for the future running of the industry. By applying basic priorities to different local circumstances, close control can be exercised. If the margin for control is about 40,000, by recruiting some 13,000 re-entrants and new recruits in addition to priority categories (say 2,000), a rundown of some 25,000 could be achieved. Obviously, by increasing recruitment the run-down would be lessened and any fluctuations in wastage rates, or in the level of demand or productivity, could be countered by easing or tightening the rate of recruitment.

4. *Changing occupation patterns*

Together with the general rundown of manpower in the industry, the Board has been faced with a radical change in the balance of occupations, largely as a result of mechanisation. There has been, and continues to be, a shortage of craftsmen in the industry and every effort has been made to increase their numbers and the numbers of craft apprentices training within the industry. Thus, while colliery manpower decreased by 14 per cent between 1960 and 1963, the number of craftsmen employed in the industry rose by about 3 per cent. Again, between 1960 and 1962 the reductions in the numbers employed in such traditional occupations as packer, timberer, collier and ripper were proportionately considerably greater than the overall rundown in the industry in the same period. At the same time the number of power loader operators increased by nearly 50 per cent.

A concrete example may be taken from the changes resulting from the introduction of new haulage systems. There has been a rapidly increasing trend away from rope haulage and, over a much longer period, away from horse haulage, as a result of the introduction of conveyors, mine-cars and locomotive haulage systems. Between 1960 and 1962 there were reductions of up to 25 per cent in the numbers of such traditional workers as tub manipulators, rope changers, horse drivers, horse keepers, etc., while at the same time the number of locomotive drivers, conveyor operators, mine-car circuit control men etc., has increased substantially. The decrease in numbers in the traditional occupations more than outweighs, of course, increases in the mechanised occupations.

All this has meant a change in training patterns, away from the older operations, though these are still important, and towards newer methods and techniques. Training is closely geared to the needs of the industry in terms of overall numbers, local needs and the most necessary skills. The Board is at present in process of introducing a Mining Apprenticeship Scheme which will link the training of skilled face-workers to the numbers needed and to the vacancies likely to arise in particular localities.

5. *Geographical variations*

The industry's problems are not the same everywhere. Contraction has been greater in some places than in others; broadly speaking, the labour force has been declining in the northern coalfields where output is either stable or falling (as exhausted and uneconomic collieries go out of production) and productivity is increasing, whereas the central coalfields have a relatively stable labour force with productivity increases improving output and compensating for manpower shortages in some places. It is, of course, possible that technological advances can hold back the rundown in the older coalfields, e.g. the development of thin seam mechanisation may keep open pits which would otherwise be impossible to operate economically.

Planning has been basically centralised, but the older coalfields have the greater proportion of old and uneconomic pits, and the newer coalfields are likely to have more new and reconstructed pits, needing extra men.

Of course, closure does not necessarily mean any loss of output potential; often men from a closed pit can be redeployed to far better use, and with far better financial results, elsewhere. Closure is part of the process of modernisation which involves a concentration of working in the best places, but overall planning can often point to the redeployment of men from one pit to another, without closure being involved, to achieve better results. Redeployment of this nature is also carefully planned, phased and controlled over long periods.

III. CUSHIONING THE EFFECTS OF CHANGE

1. *General measures*

Once the programme of phasing closures and concentrations has been worked out, taking into account social and financial considerations and productivity and demand, the pits which are to close or reorganise can receive special treatment; circumstances can change, however, because of, for example, geological or marketing considerations.

When a pit is due to close, or run down, a timetable is established for the closure or reorganisation. Nearby pits within daily travelling distance are " starved " of recruits, other than those essential to their running, for some time ahead in order to provide jobs for the redundant. Pits beyond daily travelling distance may also be " starved " of recruits. Where appropriate, men are encouraged to transfer to other collieries and there may be compulsory retirement of older men. When a pit has closed, special transport is provided to take men to their new pits.

Other steps taken by the Board to cushion the effects of lower manpower requirements were, in 1960, to retire men over 65 compulsorily (the number of such men employed had been about 15/20,000) and to end Saturday working. Neither of these actions arose directly out of increased mechanisation but both were the indirect results of the industry's ability to meet its demands with lower labour force as a result of improved efficiency.

2. *Assistance to transferees*

Manpower reduction has not, and could not, be spread evenly over the country and though surpluses in some places could not be matched against shortages elsewhere, there has been considerable success in transferring men from the contracting to the stable and expanding coalfields. In April 1962, the Board worked out a formal Inter-Divisional Transfer Scheme which was put to the unions and agreed to by them. The Scheme simplifies arrangements for men wishing to transfer and gives them some financial assistance. Transferees are paid various travelling, rent and settling-in allowances and there are arrangements for make-up of lost wages. Housing is scarce in most places and most men transferring from one coalfield to another, or long distances within the same coalfield, require houses. Local Authorities are encouraged, with subsidies if necessary, to build houses for incoming miners and where they cannot help, the Board acts itself, through a subsidiary, the Coal Industry Housing Association. At present some 14,000 houses are either being built or are planned to serve the industry's needs over the next few years. In the long run, houses near a pit stabilise manpower, especially in terms of retaining skilled men. They are, therefore, an important tool in manpower planning. In 1962 and 1963 some 5,000 men were transferred within the industry.

3. *Redundancy arrangements*

Though the Board has been generally successful in adjusting manpower to changed circumstances, it has not been able to place all the men affected. Over 100,000 men were involved in closures and concentrations in 1958-63, but the number redundant and out of work has always been small, as the vast majority have been transferred to other pits without any break in employment. Most of the remainder (about 18,000 men) have been placed in jobs before their redundancy pay ceased after six months. The number of employable men still out of work thereafter has been very small. Those men displaced and unable to be found alternative jobs get redundancy compensation pay. Under the National Coal Board Redundancy Compensation Scheme weekly compensation payments are made, continuing for up to 26 weeks for men aged up to 59 at the date of redundancy. For men aged 60 and over the maximum period for the payment is less. Weekly payments are based on the standard grade rate for the job a man was doing when he became redundant and are equal to two-thirds of the standard grade rate. In addition, lump sums are paid to men aged 51 and over, and immediate pensions under the Mine-workers' Pension Scheme are available to men aged 60 and over, when made redundant, with at least 10 years' qualifying service in the scheme.

IV. INFORMATION AND CONSULTATION

The role of the unions in all these changes has been most important. The coal industry has an official consultative machinery (quite separate from the 'concilation' machinery dealing with wages and conditions of service) mainly composed of the Board and the principal unions representing the industry's labour force. There are consultative councils at national level in London, in each coalfield and at every pit. The general position of the industry, how problems are to be tackled, questions of safety and training and other such matters, are regularly discussed. Throughout the recent period of change, all these consultative councils have been kept abreast of the circumstances of the rapidly changing situation — the change in the demand for coal, the counter-measures being taken to restore the position, the closure of pits, and plans for placing the men, etc. The unions have thus been kept aware of the situation and have been able to make any representations they wished. Apart from such contacts through the official machinery, there have been many other discussions to see that the interests of the men are looked after to the greatest extent possible. The unions have had a big part to play in dealing with the transfer of men — particularly the personal difficulties that can arise when a man and his family transfer to a new locality.

This has been a difficult situation for the unions in a period of manpower contraction and they have adopted a highly responsible attitude. Improvements in productivity have necessarily resulted in falling membership. There has been little opposition to mechanisation or modernisation and it has been widely recognised that productivity must increase. It has been understood that wages, the cost of materials, services, etc., will inevitably rise and these increases can only be met either by increased productivity or by higher coal prices; the latter might lead to a fall in sales which, in its turn, would lead to more closures and other difficulties. The unions have appreciated this situation and there have been generally good labour relations.

The facts of the situation have been regularly made known to all employed in the industry through a monthly newspaper " Coal News ". This is a widely circulated publication produced by the Board with separate editions for each coalfield. Free discussion is encouraged through its columns, and messages or controversial statements from union officials are printed. The paper has tried to give a realistic picture of where the industry is going and it has been a major factor in keeping the industry informed and united in a time of difficulty.

V. CONCLUSION

That manpower planning is possible in the face of profound technological change is demonstrated by the experience of the coal-mining industry in this field over the last few years. This may be conveniently summarised as follows:

1. 1957-63 manpower run-down by over 190,000 or 27 per cent;
2. 1956-63 productivity increased by one-third;
3. 1956-63 proportion of output cut and loaded by machine rose from 15 per cent to 70 per cent;
4. 1958-63 average number of closures per year 39 (1947-57, 20);
5. 1963: 33 closures, 46 partial closures and 4 merged — but a very low level of industrial unrest and unofficial disputes;
6. one-third of all pits reconstructed since 1945;
7. increasing average output per coal face from fewer coal faces;
8. wages cost stable since 1956, earnings up by 25 per cent;
9. of over 100,000 affected by closures and reorganisations, only a handful of men left redundant.

In fact, the most profound upheavals experienced in the industry's long history have gone forward smoothly and with full co-operation between all concerned.

Case II

NEW STEELMAKING TECHNIQUES AND COMPUTERISED CONTROL

I. INTRODUCTION

1. *The Company*

The Company to which this study relates has been established in the iron and steel producing area of South Yorkshire since 1823. Steel was first produced in 1888.

Up to a few years ago the Company was a private limited company. It now forms part of the Iron and Steel Division of a very large group of companies. It has a Chairman and Board of Directors, the Chairman having a seat on the Board of the parent Company. Prior to the recent development scheme, which is the subject of this study, the Company's main production units consisted of two blast furnaces for iron making and ten basic open hearth furnaces for steelmaking; a cogging mill and five bar mills for the processing of steel into blooms, billets, bars and sections; an arch department for the fabrication of colliery roof supports and a wire department. The annual steel production was approximately 430,000 ingot tons.

2. *History of technical changes*

Since the end of the second World War a number of major technological changes have taken place, apart from those which are the subject of the present study. The biggest of these was the construction of a new 11" continuous bar mill which went into production in 1953. This introduced major changes in rolling mill technology involving the introduction of electrical and mechanical equipment different from any previously used. It was also the company's first venture into the use of electronics for production purposes.

There have been continual advances in techniques in iron making, steelmaking and steel rolling following the commissioning of the 11" mill. And along with these developments have gone improvements in metallurgical control. The demands of the motor car and aircraft industries for very high quality steels called for attainment of high standards of quality control and procedures.

II. THE DEVELOPMENT SCHEME

1. *The new plant*

The object of the Development Scheme was to provide an increase in steel supplies to the parent Company and to the traditional markets, and to extend the range of high grade steels produced. This entailed the installation of a new steel making plant, a new primary rolling mill to replace the cogging mill, a steel strip rolling mill and all the necessary auxiliary plant. A special feature was the installation of computers for production planning and control. The new plant has been erected on a site adjacent to the existing works. Estimated annual steel production is now 850,000 ingot tons.

a) *The new steel making plant* consists of two 75 ton Kaldo vessels and one 75 ton electric arc furnace. The Kaldo process had been developed at Domnarvet in Sweden and was new to the United Kingdom. Its introduction has meant a change of the greatest magnitude, involving as it does the making of steel in about ninety minutes as against ten-twelve hours with the basic open hearth process.

b) *The new primary rolling mill* did not involve any new principles of steel rolling; but the introduction of automatic controls and ultra modern engineering techniques made it very different from the old cogging mill.

c) *The new narrow continuous hot strip mill* for the production of strip steel for tube making, a product new to the Company, embodies techniques very different from those of the 11" continuous bar mill. Much of the electrical equipment introduced is new.

d) *Production planning and process control* involved the installation of four computers with associated automatic controls. Two computers are used to assist in production planning for the works as a whole. They prepare cast lists and rolling programmes. The third computer is used for production control in the primary mill. The fourth is used for programming the shearing of the billets and slabs rolled in the primary mill into lengths giving maximum yield.

2. *The origin of the Development Scheme*

Initial action for the Development Scheme was taken immediately after the take-over in 1956. The old Company had, for some years, recognised the need for modernisation, but had not been able to take action for lack of finance.

A small study group was formed, called the Development Department and headed by the then Technical Director. It was to investigate how best the Company should develop, taking into account the new techniques which were becoming available in steelmaking and rolling practice, and including the use of computers and automatic control equipment.

The number of staff in the Development Department was very small, varying between six and eight people, in the initial stages. The disciplines represented were technical, engineering, metallurgy, transport and accountancy.

In the period 1956-59 numerous projects were designed and studied, and the result of all this work was set out in a General Report in 1959. This was accepted by the Board, and in October 1960 a scheme involving an expenditure of £ 58,000,000 was approved.

The number of staff in the Development Department had increased to 40 by this time. The Department still retained its original structure and function, with the original members directing the activities.

In April of 1961 a revison of the scheme was announced, involving an expenditure of £ 32,000,000. An ore preparation section, blast furnace and bar mill, envisaged in the original scheme, were not to be built at this stage.

3. *Technical planning*

A Development Committee was formed, under the control of the Company's Chairman of Directors, with the object of controlling and administering the project. The Committee made all major policy decisions on tenders, contractors and suppliers.

Membership of the Committee included Directors and Senior Executives of the parent Company, representatives of Consultants, and Directors and Senior Managers of this Company who were actively concerned with the Scheme.

Project teams under four directors were also established to deal with the technical, production, financial and engineering aspects of the scheme.

4. *Manpower planning*

Specialised groups were set up to be of service to the main project teams. One of these dealt with the implications of the scheme for manpower requirements, wage rates and the provision of training facilities. In addition, three union negotiating committees were established to deal with the manning, wage rates and promotion scheme arrangements in the new steel making plant, the primary mill and the strip mill.

A General Manpower Requirement Report was issued in November 1962. The manpower requirements were estimated from the experience of the operation of comparable plants or where necessary from experience of other companies in the use of similar equipment. Detailed job analysis studies were then made of the various jobs involved by means of method study and flow process charts, and these helped to finalise the forecasts of manpower requirements made at Superintendent and Departmental Manager level.

Before the construction of the new plant, the total personnel was about 4,700 (3,900 operatives and 800 staff). It was estimated that the scheme would involve the recruitment of 1,400-1,500 additional personnel, both staff and operatives, quite apart from transfers and promotions of the existing personnel.

5. *Timing of the development*

The decision to build the plant was taken in October 1960. The site work commenced about April 1961 and the plant was due to have trial runs in August 1963.

Due to delays the plant was not fully operational until February 1964. The primary mill had initial trials in October 1963, the strip mill in December 1963 and the first steel was poured in February 1964.

III. INFORMATION AND CONSULTATION

Within the Company there is a highly developed and longstanding joint consultative procedure to provide, as the Constitution says, " a free exchange of views at all levels on all matters affecting the welfare of the organisation and employees ". As well as the main Works Council there are departmental production committees and special-purpose committees.

The Company recognises all appropriate trade unions, some eighteen in number, and applies all relevant national agreements.

As soon as the original proposal for the Development Scheme had been approved in October 1960, senior staff and workers' representatives were informed about the new scheme at a meeting addressed by the Managing Director. That same afternoon representatives of the local press were informed, and simultaneously the news was given to the national press by the parent Company. Later that day representatives of the local councils received the same information. Early the following week the information was given to local representatives of interested government departments including the Ministry of Town and Country Planning, Board of Trade and Ministry of Labour, and to other interested bodies, for example British Railways, National Coal Board.

When the revised scheme was decided on in April 1961, exactly the same procedure was followed.

Progress reports were made to the press at approximately six-monthly intervals.

From the beginning, special emphasis was placed on the importance of keeping employees informed about the scheme, and the fullest possible use was made of the Company's joint consultative machinery for this purpose. The Works Council received regular, detailed progress reports on developments from the Managing Director, and similar reports were made at meetings of the Department Production and Staff Committees.

Negotiations and discussions with the trade unions began at an early date and detailed information on all aspects of the new plant was given as decisions were taken.

IV. MANPOWER FOR DEVELOPMENT

1. *Staff requirements*

At the time when the first schemes for expansion were being considered, thought was being given to the way in which staff would be provided both to develop the schemes and to operate the plant on completion. The first official action was in 1959, when a small group of staff were assigned to the Development Scheme.

The next step was a review of the existing staff, and an examination of the likely positions available under the new scheme. All members of the staff were reviewed and their capabilities and ambitions assessed.

Senior officials, heads of departments and the staff of the Staff and Labour Department then co-operated to draw up a structure of new and existing departments, and the numbers required at the various grades. From these organisational charts it was possible to assess the need for recruitment either by internal transfer or from outside the Company.

By early 1962 the structure at the top had been established and by the middle of 1962 the proposals for the final Company structure were drafted and estimates of future numbers calculated. In November 1962 firm proposals of future numbers calculated. In November 1962 firm proposals were approved by the Board of Directors. By this time the number engaged on development work had reached 128. amd the proposals contained a detailed recommendation for the ultimate employment of all but a few of them who would remain to consider future expansion programmes.

The total number of staff had reached 1,139 as compared with 750 in January 1959, and it was estimated that final staff requirements would amount to 1,330. By January 1964 there were 1,327 staff on the payroll, but in January 1965, after a development scheme had been in operation a year, a revised estimate showed that because of extension of computer applications and increases of plant working times, it would be necessary for the number to be in the order of 1,550. As the new techniques were introduced and proved, it was expected that this number would be gradually reduced, and this has proved to be the case.

2. *Areas of staff expansion*

The production departments existing before the development took place varied little in their needs. The only department vitally affected was the cogging mill which was replaced by the new primary mill and which under normal circumstances had a staff of 44. The question of redundancy did not arise since the numbers of staff for the two new mills totalled 75. By September 1963 transfers from the cogging mill to the primary mill had commenced but the cogging mill was still on continuous operation, and staff had to work extended hours. The transfer from the open hearth department to the steelmaking department encountered similar difficulties of drawing staff from a department that had to remain in full production.

The essential requirement of the new steelmaking and rolling department was for staff who were more technically and scientifically qualified than previously.

Engineering and maintenance department underwent a large expansion. In January 1959 the department had a staff of 61, in January 1963 140, and in 1965 151. This total included the increased civil engineering department staff.

Maintenance planning was given greater emphasis which caused an increase in staff from 13 in 1959 to 76 in 1965. The technical service departments, including the metallurgical, chemical laboratories, and inspection staff, more than doubled, from 114 in 1959 to 271 in 1965, to cover plant requirements and more stringent customer demands.

Automated equipment, computer control planning and information handling, all new to the Company, required the engagement of specialist staff, who proved to be difficult to recruit. Also these staff requirements were under-estimated. In the original estimates the number of staff required for information handling and process control was given as 49, whereas 89 were employed on the work in January 1965 and a further 6 were still needed. In the primary mill the original estimate was 55 compared with the 115 eventually needed.

3. *Transfer of operatives*

An invitation was extended to all the Company's employees to apply for work in the new departments, but the Company reserved the right to select for the new jobs, having regard to seniority and suitability. For the senior positions in the new steelmaking department the Company selected younger men from the furnace teams in the existing steelmaking department. This was considered necessary because of the technical nature of the new process and the increase in the speed of operation. In the case of the primary mill and the strip mill, the men were selected, generally from among the operatives in the cogging mill which was to close ultimately.

The co-operation of the trade unions was very valuable, in that they permitted the relaxation of certain long established arrangements, so that the transfer of large numbers of men to the new departments could be made with the least possible dislocation of existing production.

Because of the Company's desire to man the new plant by the transfer of existing employees to the fullest possible extent, there was a major problem in maintaining production from existing plant, in particular the cogging mill. The cogging mill operatives agreed to work a forty-eight hour week instead of their normal forty-two hours for quite a long period, thus permitting the release of fifty men to work in the primary mill in the initial stages. Thereafter repeated revisions to working arrangements were agreed to permit further transfers of men as the operation of the new plant developed. Use was also made of newly recruited workers, who were placed temporarily in jobs which had already been allocated to long service employees, and who were subsequently transferred to other permanent jobs.

Although special attention had to be paid to the manning of the three new production departments, there were also the services and maintenance departments to consider. In general, experienced craftsmen were transferred for this purpose, but it must be emphasised that they were to deal with plant and equipment involving new techniques.

The number of operatives transferred from the old works to the new plant was 2,005. The number who transferred from operatives to staff was 106. A " considerable number " changed jobs within their departments following the transfer of senior personnel.

4. *Recruitment*

Recruitment of the additional staff and operatives required did not constitute a major problem, though there was some difficulty in recruiting people with specialised knowledge. Geographically the Company is well placed for recruitment, having an insured population of 85,000 within a five mile radius of the works.

a) *Recruitment of staff*

The main period of staff recruiting was from July 1963 to December 1964.

In response to press advertisements some 782 applications were received from males, 402 were interviewed and 305 were engaged. Difficulty was experienced in recruiting certain grades of staff: technician grades — e.g. process control and instruments, metallurgical — and general clerical grades. In the technician grades the Company met the deficiences by employing staff with a suitable science education; after a special training course they proved quite suitable for the jobs. However, in the general clerical grades, particularly in processing computer information in the primary mill, there was, and still is, difficulty in recruiting and keeping suitable staff.

During the commissioning period the number who left was 184, giving an average monthly turnover figure of 9.5 per cent.

b) *Recruitment of operatives*

There was no shortage of applications for jobs in response to the Company's advertisements in the press. The main recruitment of operatives for the development stage and subsequent production commenced in August 1963 — fifteen months before the project was due to be completed. Recruitment of additional junior operatives and apprentices had commenced in 1961-62. During that year the number of boys entering the Junior Operative Training Scheme was twice that recruited in 1960, and the number of craft apprentices increased from 95 to 155. The trade unions concerned gave full agreement to the recruitment of apprentices in numbers greatly in excess of normal. Many of these apprentices have been able to do craftsmen's jobs within the limits of their capabilities, thus reducing the demand for skilled craftsmen at a time of serious shortage.

From August 1963 until November 1964 some 4,000 applications were received. Of these an estimated 2,000 were interviewed and 1,241 were recruited (123 craftsmen, 904 unskilled workers and 214 youths).

The rate of recruiting was 77 per month and the wastage was 484 in all, or an average of 30 per month.

5. *Stages in manning the plant*

The manning of the plant was in six distinct steps:

a) *Appointment of senior staff*

From the beginning it was accepted that the senior staff of the Development Department would have responsibility for both the old and new sections of the works. These were the Director in charge of the Department and his immediate subordinates, Chief Engineer, Technical Officer, Metallurgist, etc. They had been seconded to the Development Department and others had been promoted to operate the old plant in their absence.

The supervisory managers for the sections in the main plant were not appointed until the project was well under way. There were no appointments made of middle or junior managers at this stage.

b) *Selection of key operatives*

The job requirements of the key operatives were discussed in the early stages of the project. As most of the likely contenders were well known to the management the problems of selection were considerably reduced.

c) *Training of key operatives*

The training of key operatives began considerably in advance of the training of staff and non-key operatives.

d) *Apointment of key operatives and staff for initial shifts*

There is no doubt that the first shifts of operation contained the best trained operatives and staff. Due to commissioning delays, the training periods had been extended and some of the operatives had assisted in plant commissioning and so added to their knowledge.

e) *Transfer of operatives and staff for full operation*

The first shifts in every department had a very high proportion of key operatives and staff. When the second and third shifts commenced, the key operatives and staff had become settled into routine and were able to accept a higher proportion of inexperienced employees.

V. TRAINING FOR THE DEVELOPMENT SCHEME

Training for the Development Scheme really began in 1961 when young people were recruited into the existing training schemes. During the ensuing three years the numbers recruited were substantially increased and a new craft apprentice training workshop was built to provide the extra accommodation needed and to improve the training facilities.

1. *New training requirements*

In the early stages of the Development Scheme senior management recognised the difference in skills and labour requirements between the old works and the new, particularly as regards controlling large and very expensive items of equipment.

On the question of training " key " operatives for the works, it was decided that the basic policy would be to train and educate existing employees for the new jobs. Newly recruited labour would then fill the remaining vacancies.

It was realised that if all the training and education was done within the Company the employees could become insular. So the Company arranged for some operatives and staff to spend time with other steel companies, both in England and overseas. At the conclusion of the Development Scheme some 200 employees had visited other companies for periods of time varying between a few days or two weeks.

2. *Development of the training programme*

The first step in the training scheme was to estimate the content and examine the timing requirements. So three sets of two people from the labour and training department were assigned to examine the jobs in steel plant, primary mill and small rolling mill respectively. Working with these groups were the future managers of these departments and in some cases the engineers who would be involved in the operations when production commenced. The initial work was necessarily a theoretical evaluation of the job requirements rather than a detailed job description.

These groups were formed in March 1962 and completed their broad outline reports in November 1962.

The second phase was spent in detailed examination of job requirements and analysis for a training programme. In this phase the Training Supervisor, Staff and Departmental Supervisors were engaged full time.

The method of assessing the content of the training courses was to review and record all relevant information obtained from manuals, equipment manufacturers' catalogues and operating instructions, instruction courses in other companies on similar types of equipment, and personal experience of job evaluation methods. Advice was obtained from a safety officer on the safety aspects of the methods adopted.

This part of the work began in November 1962 and was completed in mid-1963.

3. *A training problem*

A major difficulty in presenting information was to bridge the knowledge gap between engineers and managers and the operatives. The engineers and managers were unable to appreciate why operatives could not understand standard engineering practices and methods of presentation. As a result they under-estimated the amount of time required for training programmes.

Subsequently the engineers gave greater attention to issuing clear instructions and making sure the operatives understood them.

4. *Training courses*

a) *Kaldo furnacemen*

There was a one week's induction course dealing principally with pneumatic processes and the design and operation of the Company's furnaces. On completion of this course, the four senior furnacemen visited Domnarvet in Sweden for a period of two weeks where they were able to observe a Kaldo unit in operation. On returning, they spent eight or nine days working on the simulator in the Training Centre and producing mock charges.

The Kaldo simulator consisted of a full-scale replica of the operator's console complete with Mimic Diagrams and working models of the actual furnace and ancillary equipment. In some aspects the simulator instruction was superior to instruction on the actual Kaldo furnace, since it was possible to cut the models and show the internal workings of the process and correlate these movements with the instrumentation.

Continuous practice on the simulator gave the men confidence in their ability to operate the complicated mechanisms in the furnaces under their control. Two or three weeks were then spent on plant instruction, interspersed with informal classroom talks.

b) *Electric arc furnacemen*

The electric arc furnace operations are simpler than the Kaldo, and the supervisory staff were familiar with the method.

These furnacemen received one week's classroom introduction to the process, followed by training periods, varying from one week to seven weeks, at another steelworks where an electric furnace was already in operation. During this period the trainee worked with his opposite number. Then the men came together again in the Training Centre for classroom instruction and discussion on what they had seen. This was followed by plant instruction until the furnace was commissioned.

c) *Primary mill and strip mill*

Due to the varying types of control work many of the key workers for the primary mill received one to four days extensive theoretical training before visiting other companies in this country. The length of time spent on external training depended on the individuals' occupation and varied from three days to four weeks. During their stay at other works the men worked alongside their opposite numbers. On returning to the Company they received further training either individually or in groups, depending on the job. This consisted of classroom instruction interspersed with instruction on the plant. The operatives were then placed in the new mill to assist in commissioning the plant.

Training of key operatives for the strip mill followed a similar pattern to that given to the primary mill operatives. Prior to their visit to other firms the men were given check-lists on what to look for and the type of question to ask.

d) *Crane drivers, etc.*

Formal training courses were put into operation for crane drivers coming on to the new plant. Generally the length of the course varied from one to three days for the most experienced drivers, to two weeks for the inexperienced. The men were given practical and written tests. This course was followed by a period of practical instruction on the training crane and a period of work under supervision on the crane to which the trainee had been allocated. Similar courses were held for boom truck drivers and fork lift truck drivers.

e) *Locomotive crews*

Locomotive drivers, shunters and general assistants already had established training courses for two weeks, one week or three days. A one day ' conversion ' course was introduced to give them instruction in the automatic control systems and new work patterns.

f) *Staff training*

Most of the staff training was by necessity of an individual nature, particularly for the more senior positions. If specialist training was considered necessary it was undertaken at some organisation outside the Company. But residential courses of one week's duration were given to staff associated with each of the new production departments. Production, engineering, metallurgical, inspection, fuel and production planning staff attended these courses.

There was no shortage of opportunities to train management staff outside the Company, and the Company fully utilised these. The Company provides the opportunity for many grades of management and supervision to be trained in management principles at courses organised by the parent company and by the British Iron and Steel Federation. The duration of the management and supervisory courses varies from three months to one week. Many works-based courses on aspects of supervision are also a regular feature, e.g. Ministry of Labour ' Training within Industry ' courses.

Before the scheme became operational, the Company found it necessary to give training at all levels in production control procedures. Key computer personnel had a three weeks' course at the English Electric Company's Computer Training Centre.

VI. WAGES

The wage agreements negotiated with the unions became operative as the new departments came into production, and provided certain minimum guaranteed payments during the initial period of low production. During the training periods operatives received the average weekly earnings of their normal occupations before transfer.

There was a complication in that men selected for early transfer from the cogging mill would, in many cases, be financially worse off than those remaining behind. To help offset this, allowance payments were made until the closure of the cogging mill.

Many men on transfer from the cogging mill to a new mill were reduced in status and in earning power. Compensation has been paid to those who have suffered financially, based on age, length of service and reduction of earnings. These payments, ranging from a few pounds to three hundred pounds, were made to about 120 men.

Apart from these men, who have been reduced in status, the level of earnings in the new departments is generally comparable with that in other departments of the Company. It also compares reasonably well with earnings in similar occupations in other companies in the steel industry.

There were no payment problems affecting services and engineering personnel as wage rates were well established for similar occupations in the existing works.

VII. SOME RESULTS

1. *Changes in Company organisation*

Prior to the development, the senior management consisted of a Chairman, a Managing Director, an Assistant Managing Director, two other Directors and four senior executives. In 1964 the organisation chart showed a Chairman, two joint Managing Directors, four other Directors and twelve Senior Executives.

At middle management level many staff changed their jobs. A number of people with special qualifications were recruited from outside the Company, initially working in the planning and progress of the installation of the plant, and subsequently integrated into the management organisation. So far as staff generally were concerned, the changes meant promotion or increased responsibility.

2. *Effects of automatic data processing*

Automated equipment, computer control planning and information handling, were all new to the Company. The computer has been the main reason for the change in structure of the Engineering Department (which now incorporates the Process Control (Automation) Department), and the Management Services Department which has increased in authority (because of the increasingly important function of Production Planning). A further effect on management structure arose from the computer's control of the automation processes in the primary mill.

At the beginning of operations the four computers were supervised entirely by graduates trained in computers, but there has been some replacement by company-trained employees as the development content of the work reduced and the tasks became more routine.

3. *The new production departments*

The attitude of operatives to the changes varied considerably between the steel making department and the rolling departments. In steel making, management and operatives are working together to produce steel by methods new to the company. The operatives came to the new department on promotion and from choice. In the new rolling mills the operatives had no alternative but to move as the cogging mill was to close. There were two additional obstacles to their ready acceptance of the change, one being that some men had a reduction in status and the other that the rates negotiated did not reach the level of wages earned when the old mill was in full production.

So far as the work of the operatives is concerned, the Kaldo and electric arc processes of steel making are highly mechanised, but are still far from being automated. They call for close co-operation between the management and the melters. Much physical work has been removed from the operatives but they are now required to work continuously. Previously they would work very hard in spurts and have periods with little to do.

The big change in the primary mill is the use of automatic controls involving the operatives in the use of closed circuit television and telecommunications. The department is huge and men who are allocated to individual tasks at considerable distances from one another have found it difficult to settle down to this strange situation. In the strip mill the process is entirely new and the men had to become accustomed to working at high speed and to very fine limits.

4. *Output*

The Company has had difficulty in keeping a constant flow of production in the two Kaldo furnaces, because of mechanical failures and difficulties with the refractory linings.

Although total output has not yet reached the levels expected, production almost doubled between 1959-1960 and 1964-1965, and productivity increased by about 30 per cent.

Case III

MODERNISATION AND SHIFT WORK IN A COTTON MILL

I. INTRODUCTION

1. *Industrial background*

This part concerns a cotton mill in Lancashire, the home of the British cotton textile industry. For several decades, and for a number of reasons, the industry has been contracting, with a corresponding decrease in the labour force. A notable landmark in this process was in 1959, when the Cotton Industry Act came into being. This was an Act " to enable schemes to be made with a view to eliminating excess capacity in the cotton industry, to provide for paying compensation for any such elimination and for raisins the sums required for that and other purposes by levies on the industry; to enable the Board of Trade to make contributions towards any such compensation and to make grants for the re-equipment of the industry; and for purposes connected therewith ". A requirement under this Act was that arrangements be made at industrial level for the payment of compensation to employees in respect of any resulting loss of employment.

The first stage, which involved the scrapping of old machinery, is virtually complete. The industry is now making progress with its plans for re-equipment and in the last four years output per head has risen. Immediate repercussions from the re-equipment scheme could not be envisaged with any precision. Installation of new plant requires careful timing and balanced production between the different processes before it can be fully effective. However, it is clear that progressive firms in the industry are taking steps to secure their future and that of their labour force.

This is evidenced by the fact that capital expenditure has increased from £ 14,200,000 in 1958 to £ 25,500,000 in 1961. Indeed, the cotton industry in the United Kingdom is fast becoming a very capital-intensive industry. Mule spindles now comprise only 17 per cent of the total spindles, against 23 per cent immediately after the reorganisation scheme and 39 per cent before. Automatic looms now account for about 35 per cent of the total, as compared with 28 per cent after the reorganisation scheme and 19 per cent before. Roughly one-third of running splindles in Lancashire are now on two or three shifts, compared with only one-twentieth before the reorganisation. The proportion of looms running two shifts has increased from less than 15 per cent to 24 per cent in the same period, and the proportion of three shifts from below 5 per cent to 13 per cent.

2. *Company background*

The cotton mill to which this study relates is a subsidiary of a large public company whose headquarters controls thirty-five production units, most of which are in Lancashire. A wide range of textile products is produced at the various mills, which are engaged in the spinning, doubling and weaving of cotton and manmade fibres. The Group's total labour force in the United Kingdom is approximately 10,500.

The Company has a central personnel department whose services include employment, training, joint consultation, health and safety, and employee services or welfare. A quarterly house journal disseminates Company news; for example, the current issue includes an article giving information about the Company's accounts for the year ended March 1963 and points of interest from the Chairman's annual statement.

The Company negotiates with the trade unions through the appropriate employers' associations, and, when necessary, direct. Relationships are good and the Company and industry have a strike-free and trouble-free record. Trade unions are strongly established and most of the hourly paid labour force belongs to the appropriate union. Indeed, a current notice prominently displayed on a works notice board states that, in agreement with the unions, the Company has a strong preference for trade union labour and recommends that existing workpeople and newcomers to the mill take steps to join their appropriate trade union.

3. *Local background*

The mill is located in a traditional cotton town. In 1953 approximately 32 per cent of the employee population of the area was employed in textiles, whereas in 1962 the percentage has dropped to approximately 18 per cent. This reflects the reduction that has taken place in mule spinning. Nevertheless, cotton is still second in the area in terms of numbers employed, and in 1962 employed 14,397 out of the total number employed in the area.

The mill itself consists of two units on one site. No. 1 was established in 1903 and No. 2 in 1920. The combined labour force is 657, working on various shifts as follows:

Normal day shift	337
Double day shift	90
Evening shift	160
Night shift	70

This study is primarily concerned with the modernisation of No. 2 Unit which before the changes employed 133 men and 81 women; of these, 106 men and 30 women were employed on the mule-spinning process. The mill is regarded locally as being a good place in which to work and since 1952 has provided steady employment for its workers. It is fortunate in having three corporation housing estates within a mile radius. The General Manager enjoys a good deal of autonomy and authority under the general policy laid down by the Board of Directors.

II. THE TECHNICAL CHANGES

The technical changes really began in 1954 when the mill was taken over by the parent company. A ten-year plan was devised, as a result of which both units of the mill would be modernised. The plan, involving an expenditure of almost one million pounds, was in two five-year stages and will be completed in the spring of 1964. By that time, the total productive capacity of the mill will be increased from 60,000 lbs. to 200,000 lbs. of yarn a week.

The first five-year plan concerned only No. 1 Unit. New opening and blending machinery was installed, short process techniques were introduced into the cardroom and all the mule spindles were replaced by ring spindles. Redundant mule spinners and ancillary personnel were either transferred to similar work in No. 2 Unit or were retained for work on other new machinery. The first five-year plan was completed in 1960.

There was some delay in starting plan No. 2 because of the uncertainty and problems facing the industry and company. However, it was clear that a decision had to be taken on the future of No. 2 Unit if it was to remain an economic force. The General Manager was instructed to prepare specific proposals for consideration by the Board of Directors. These were submitted in 1962, together with his considered opinion " that the present labour force at the mill was too good to be dispersed ". The plans for modernising No. 2 Unit were approved at the end of 1962, for completion by March 1964. The technical changes proposed were:

Cardroom:

One half of the cardroom to be scrapped and a new cardroom built containing the most up-to-date machinery to operate on a double day shift basis. The remainder of the existing cardroom to continue operating as at present, with the exception of the cards which will go over to double day shift.

Spinning rooms:

a) three mule spinning rooms to be scrapped and only 20 out of the 80 mule spinning frames to be retained; these to operate on double day shifts at first and subsequently on a continuous three shift basis;

b) one of the rooms to be converted into a ring spinning room, and approximately 18,000 ring spindles to be installed and operate on a three shift basis.

Other facilities:

New floors to be laid and air conditioning installed. New cloakrooms and restrooms also to be provided.

Mule spinning is a declining occupation and it is interesting to understand management's reasons for retaining 20 mule spinning frames. Firstly the mill has some customers who, for technical reasons, rely on mule spun yarn. Therefore so long as it was possible to operate mule spinning frames economically, e.g. by three shift operation, it would be possible to meet customers' requirements and retain goodwill. Secondly, the mill management wanted to provide work for its labour force of mule spinners, most of whom were in high age groups and many of whom might find it difficult to change to other jobs.

The changeover to high-speed preparatory and cardroom machinery and ring spinning required careful planning by the mill management, especially since continuous shift working is an essential economic element in these technical changes; but no fundamental alterations have been necessary during the programme.

The new plant and machinery are standardised commercial products. A time schedule was prepared giving expected monthly progress from the beginning to the end of the scheme.

As well as the time schedule for plant and machinery, a programme was prepared for the movement and enployment of workers during the reorganisation. This was in more general terms and less precise than the machinery schedule.

III. ASSESSMENT OF MANPOWER REQUIREMENTS

According to management forecasts, no significant changes would take place in the numbers employed in No. 2 Unit. Under the old system, 80 mule spinning frames worked a 42 1/2 hour week and the process employed 136 workers. Under the new system only 20 mule spinning frames would be retained but working on a three shift basis would employ 91 workers. Furthermore, the introduction of 44 ring spinning frames working on a three shift basis would require 27 men and 31 women. These would be recruited from the existing labour force and only where necessary from outside sources. The night shift would be staffed by male labour.

It was possible for the management to determine its labour requirements with a reasonable degree of accuracy. First of all, there was information about work loads from machinery suppliers and other users of the equipment. Secondly, the mill used the Work Study Unit of the parent company, and also the technical research services of the employers' association.

IV. INFORMATION AND CONSULTATION

It was the declared policy of management to keep workpeople and their representatives fully informed. As a result, whilst there was some apprenhension about the changes, there were virtually no rumours.

When the scheme was approved by the Board of Directors late in 1962, the General Manager immediately informed his management team at the mill and they were made responsible for dealing with any query that arose. About Christmas 1962 the workpeople were told by the General Manager that technical changes would take place in 1963 and 1964 and that they would be given details as soon as they were available. It was made clear that little or no redundancy would result and that alternative work would be offered to those concerned.

The entire plan was discussed with the trade unions involved. The Secretary of the local card blowing room and ring frame operatives' association said that the early consultation that had taken place was much appreciated. His union was prepared to accept shift working and modernisation, so long as due regard was paid to such factors as wages, lighting, machinery spacing and welfare.

The Secretary of the local cotton spinning and twining operatives' association, which looked after the interests of mule room workers, said that it was a fact that mule spinning was a declining occupation as their membership figures would show. His unions had been fully consulted by the mill management. It was appreciated that 80 mule spinning frames on a single shift was not an economic proposition, and shift working was accepted subject to conditions agreed to by the management.

The Secretary of the local weavers, winders, reelers and beamers' Association said that at all times his union had been consulted and told what was going on. The mill had a good reputation and there had been no stoppages. Indeed, the last complaint he had received from one of his members was in 1958. His union was prepared to accept shift working.

In May 1963 every employee in No. 2 Unit received a statement relating to the changes, signed by the General Manager. The following extracts give the main points of this statement.

To all operatives and staff No. 2 *Unit* - 13*th May* 1963

> " This memorandum has been prepared so that all employees will have full knowledge of what reorganisation is to take place in No. 2 Unit and what effect it will have.
>
> " Your Directors and management have considered the position of No. 2 Unit very carefully for many months before finally deciding upon a policy for this unit. In its present form, the working of No. 2 Unit both in method and operation will be outdated and uneconomic and it has therefore been necessary to decide what changes will take place. Unless these changes are effected quickly, efficiently and smoothly, the secure employment under good conditions, which has existed for many years, will be in jeopardy.
>
> " Redundancy will be kept to a minimum and alternative employment will be offered to the majority of people concerned. If, however, this cannot be mutually agreed and an operative is displaced, then compensation will have to be claimed under the 1959 Redundancy Scheme. Similarly, if a reduction in the standard wage occurs this will also be dealt with under the Scheme.
>
> (Details given of changes.)
>
> " When this reorganisation has been completed, we envisage one of the most modern units in the country. The estimated time to complete the project is twelve months. As we have experienced in the past, we are hoping for the utmost co-operation from all concerned in our efforts with this plan, which we are convinced is in the best interests of all in the mill.
>
> " The entire plan is being discussed thoroughly with all the trade unions involved. There will, no doubt, be many questions which some of you may wish to ask and it is proposed to hold representative meetings of operatives and management at regular intervals. At these meetings questions may be asked and problems sorted out whilst an up-to-date report will be given on the progress of the reorganisation.
>
> (Signed) General Manager "

V. MANPOWER POLICY

1. *Minimising redundancy*

In February 1963 recruitment from outside the mill ceased and only re-started when vacancies could no longer be filled by employees who would otherwise have been surplus to requirements. As already stated, assurances had been given to the existing labour force that there would be little or no redundancy, provided they were willing, if necessary, to transfer to other work and to another system of working.

In general, Management felt that it would not be in the best interest of workers over 65 years of age to take on continuous three shift or permanent night shift work. With a few exceptions these elderly workers were, in this way, enabled to claim compensation under the 1959 Act. Redundancy was in fact confined to cases of this kind.

2. *Recruitment*

The mill has a good reputation as an employer and normally has no difficulty in recruiting labour; indeed, for most jobs there is a waiting list. It is usually possible to fill vacancies either by reference to the waiting lists or by asking existing workers to bring friends. Government and other agencies are used as and when necessary. No Personnel Officer is employed at the mill and workers are interviewed and selected by management and supervision. An application form is used and a personnel record is maintained. The interview is the main factor governing selection and there are no aptitude, dexterity or medical tests.

For the new machinery, however, the policy has been to transfer existing labour from other parts of the mill. If they have not been willing or suitable for transfer then workers have been recruited from outside.

3. *Training*

The policy of mill management is a system of training on the job under skilled and experienced operatives. These, in turn, are supervised by the foreman, who is held responsible for the training of the workers and their subsequent performance. At this mill, Specialised Operative Training (sponsored by the Productivity Centre of the Cotton Board) is not at present in use. However, the management plans to introduce this system of training into the ring spinning room in the near future.

The selection of workers to be retrained was carried out by supervisors and management who, by close and intimate contact with the workers concerned, were able to identify the personal qualities necessary for the job. No worker was retrained unless he or she appeared willing and adaptable. The degree of training required varied and depended on the previous experience of the worker. In a number of cases, e.g. in the preparing processes, the new job was very similar to the old job and thus posed few problems. The change from mule spinning to ring spinning was more complex, but again posed no great problems for the younger, adaptable and willing mule spinner.

4. *Wages*

The technical changes involved only hourly paid workers. They were assured there would be no loss of earnings during the period of adjustment, and, when placed in their new jobs, many workers would have prospects of earning more pay. If for any reason earnings dropped, the worker concerned could claim compensation for a fixed period under the 1959 Act.

Wages for work on the new plant were negotiated with the appropriate trade union.

VI. Problems of adjustment

The plan as originally conceived was being carried out without any fundamental or major alterations. It would not be completed until the spring of 1964. It was not yet clear what would be the final results and repercussions. Certainly, everybody in No. 2 Unit would benefit by improved working conditions, continuity of employment and, in many cases, the prospect of an increase in earnings.

A management view expressed was, " In a contracting industry, mills have to decide whether to re-equip or close down. What is taking place in this mill shows that the Company has confidence in the future. This gives management and workpeople a feeling of security. There have been two major technical changes in this mill in the last ten years and there will doubtless be others ".

The introduction of shift working was probably the greatest single factor of concern. The management felt that labour turnover might increase until the scheme had been running for some time. A 62 year old mule spinner, for example, who has worked at the mill since he was 12 years of age, had been asked to transfer from day working to shift working, but he thought it too much at his age. He wished he could have retired but implied that he could not afford to do so. (There is no Company pension scheme for hourly paid workers.) He added, " Changes have got to come and management in this mill seem to have the right ideas. The new machinery shows they mean business and I hope they will now be able to compete. "

A married woman worker said, " I've been at the mill a long time and I don't like moving to other jobs. The Company is trying to do the right thing and tell us what's going on. It will mean me going on to new machinery which will be all right, but I'm not sure yet how I'll get on with shift working. I'll see how it goes ".

A male mule spinner said he had transferred to the new machinery in the cardroom. He had been shown how to do the job and so far there were no problems. He said, " Shift working has to come with new machinery. It gives people confidence to see new machinery being installed on a big scale. In this mill we're told what is going on. Other places I've worked at, I've been told at tea time that the job would finish ".

The General Manager of this mill emphasised the necessity for management to plan well ahead and to provide for early and adequate consultation at all levels. He said, " It has been my experience that if the workpeople are told what is going on, management can expect and will undoubtedly obtain the confidence and support of the labour force ".

Case IV

INTEGRATING TWO HOSE UNITS

I. INTRODUCTION

1. *Background*

The Company is an old-established Scottish firm which was started in 1856, originally for the manufacture of rubber boots. Over the years the Company has grown in size and now produces a variety of rubber products, tyres, footwear, conveyor belting, hose, rubber flooring and other new products. After the war an American company acquired half of the ordinary capital and in 1956 increased its holding and took over control of the firm.

The works is located in the central area of a city with a population of 468,000 (employed population almost 219,000). It is the second largest industrial employer in the area, where there is a considerable diversity in the types of industry. Whilst there is some shortage of female labour and certain classes of skilled men, there is normally no difficulty in the recruitment of semi-skilled men.

The total labour force is 1,807 comprising 1,162 men and 207 women in the works, and 320 men and 118 women on staff. There have been slight fluctuations, although redundancies have been few, and the general trend has been a gradual fall in the number employed mainly due to improved methods of work, and mechanical aids.

2. *The nature of the change*

The Company had two separate hose units in the plant, but some distance apart, producing suction and delivery (small diameter) hose. As part of a £ 3,000,000 reorganisation plan, it was decided to build a complete new hose factory, with stores and other ancillary units, in which the existing hose units would be integrated. It was planned to extend production to include products that the Company, because it did not have the space to take the necessary special plant, had not previously manufactured. These included giant suction and discharge oil hose for quayside tanker loading and discharge. The new factory is 120,000 square feet and is considered to be the most modern hose factory in Europe.

The changes were necessary:

- — to keep in the market for existing products;
- — to widen the field by the introduction of new type of hose;
- — to satisfy customers' requirements for larger hose units.

Hoses are large tubes which are built up on circular mandrels of varying lengths; they comprise synthetic rubber fabric and steel wire in varying amounts. When the hoses have attained their tube form they are vulcanised, removed from the mandrels and prepared for despatch.

Initially the technological change involved the changeover from almost entirely hand work processes in the manufacture of suction and delivery hose to processes using mechanical aids such as winches for stripping, and cranes for handling. Later, and the programme is still incomplete as the production of long length hose is at present being introduced, new types of hose previously not produced in Britain were added. The change involved still further use of mechanical aids, particularly the automatic wire applicator. The operator controls the mechanism regulating the flow of wire in the winding operation. Technical developments in oil drilling, tanker loading and unloading have led the Company to develop larger diameter hose at present up to 20 inches, but consideration is now being given to the production of 24-inch diameter hose.

Some of the earlier types of hose were standard commercial products but others were specially developed by the parent company in America and additional improvements have been added since their manufacture was started in Britain. The specifications and drawings were sent to Britain and the plant was manufactured here. Thus the Company were able to draw on the manufacturing experience of the parent firm.

3. *Manpower changes*

The old hose units employed 98 of whom 30 were in the oil hose unit, 58 were in the mill and 10 were staff responsible for both units; the total number employed has now been increased to 158 but has not yet reached full labour strength. It is estimated that 70 per cent of the employees are semi-skilled, 10 per cent unskilled and the remaining 20 per cent are technicians and other staff. The skills required in the job are mainly manual dexterity, adaptability as the men have to be able to deal with up to sixty operations, and, in some operations, speed.

II. PLANNING AND IMPLEMENTATION OF THE PROJECT

After the American firm obtained full control, a senior official was sent to the British plant to survey the major areas of reorganisation. On completion of this, he became the Managing Director until the end of 1961, and was thus able to see the project firmly established, even if incomplete.

1. *Planning groups*

The major groups concerned with the planning, and subsequent building installation, labour standards, production and sales, were:

a) *The Partnership*

Each major product unit, e.g. hose, tyres, plastics, operates its own " Partnership " consisting of senior management (manager, works director, works engineer, etc.) who meet the managing director. In connection with planning the hose project, the two senior officials on Production and Sales had a monthly meeting at which the Managing Director was present. Heads of Departments were called in according to the subject under discussion e.g. finance, technical production, engineering, or industrial engineering.

b) *The Hose Project Group*

Although the Factory Services Manager had the ultimate responsibility, a Hose Project Group was in operation for three years. The group was responsible for all matters connected with the building programme (supervision of the various contractors, layout, and choice and installation of machinery and equipment). The project engineer and at least one of his group were lent by the American parent company.

It was found that statements had to be prepared at four to six week intervals to give the correct position in view of building difficulties, installation of plant, changes in production, future orders.

c) *The Labour Standards Committee*

This Committee consisted of the Industrial Engineering Manager and Leader of the Hose Group, the Wages Controller and Industrial Relations Officer as permanent members. Other members of management attended when subjects related to their responsibilities were discussed.

This continued for approximately two years, dealing with job specifications, job evaluation, the establishment of labour standards and the rate of pay for each operation.

Details of operations to be transferred to the new hose building were listed, giving the number of operations involved, present occupational wages, average earnings, etc.

Prior to the move from the old unit to the new, temporary estimated values were prepared for each operation. After the transfer these were reconsidered, and new values allotted where necessary; in view of changes and new types of hose being produced, up to date amendments have been frequent.

The manpower estimates were prepared by the Company's Industrial Engineer although some information was available from the parent company and from the manufacturers of the plant.

2. *Timetable*

The factory was built by outside contracting firms, and consulting firms were used for specialist work. Difficulties arose because of the number of contractors whose work had to be co-ordinated to allow an even flow and keep it to the estimated time schedule.

The transfer of the existing equipment and the installation of new plant was carried out by outside contracting firms or by employees from the firm of manufacture.

There were alterations to the timing of the project, particularly in relation to the transfer of the original sections to the new factory. The pressure for production and the necessity to produce a rush order meant that the transfer was carried out earlier than the schedule time, but dislocation was minimised as the programme originally laid down was reasonably flexible.

Whilst delivery of most items of equipment was reasonably good, failure to receive one item could throw the scheduled programme out of gear. Fortunately, delays in production were lessened by the planning and the allocation of specific duties. The Project Group, working closely with all management, often found a way round a problem.

III. INFORMATION AND CONSULTATION

1. *The Company magazine*

As early as 1956 the monthly magazine, issued by the Company, referred to the £ 3,000,000 modernisation plan, including the hose factory, and said that the consent of HM Treasury to a new issue of ordinary shares had been approved. From then onwards the news-sheet included items regarding the new factory with frequent pictures of progress. A monthly photographic record was also kept, starting with the demolition of an old unit to make room for the hose factory. Such articles and pictures continued at intervals for five years; information was also given of the official opening by the Queen Mother and the many parties of visitors.

2. *Full-time union representative*

Around 1950 the Branch Secretary of the union representing semi-skilled and unskilled workers who worked in the factory, transferred to full-time union work, but was paid by the Company. This enabled him to devote his whole time to assisting the management to maintain good industrial relations in the plant as a whole. Throughout the entire project he was kept informed, shown the plans, statistical information, etc. by the Project Engineer. He was a member of the Hose Advisory Committee and the Joint Production Committee (which has been in existence for many years), and thus worked closely with the factory management to overcome initial difficulties. The firm, through him, notified the Divisional Organiser who visited infrequently.

3. *Joint Production Committee*

The Joint Production Committee for the factory as a whole was given information monthly on the progress of work and any difficulties which had arisen. This was the Company's normal policy and covered developments in other sections as well as the hose factory. The representative from the latter was able to raise any item he felt of major importance.

4. *The scale model*

A scale model of the new plant was made. This was discussed with groups of five or six men — workers of the old hose unit — by the Project Engineer. They were shown the type and spacing of machines, the operator's working position, and at this stage it was possible to answer queries. This helped to create interest and enthusiasm for the new unit, and to minimise difficulties.

5. *Hose Advisory Committee*

After the start of production in the new factory, the *Hose Advisory Committee* met monthly during working hours. The Hose Manager, Wages

Controller, and varying members who had a responsibility for an item under discussion represented management; the full-time Union Branch Secretary and a man from each of the main production operations represented employees — with the Industrial Relations Officer as Chairman. They discussed difficulties which had arisen, production standards and grievances which affected the smooth running of the department. This continued for approximately two years.

6. *Informal ad hoc meetings*

Informal discussions were frequently held, particularly as problems arose. When there were difficulties about quality the Manager, Technical and Quality Control, had a discussion with the men on the job in question. Machine breakdowns and teething problems of new plant causing idle time were discussed in a weekly meeting between the Divisional Engineer and the men until the problem was overcome.

Throughout the whole project covering the past five years there was regular discussion with both management and workers to iron out any difficulties which might, or did, arise. The men obviously appreciated the attitude of the Project Engineer who was approachable and willing to discuss difficulties with them and who encouraged them to bring forward suggestions for improvement and to try out their ideas.

7. *Divisional Safety Committee*

Initially, there was an increase in minor accidents, probably due to a new plant, some inexperienced labour and, perhaps of greater importance, the change from a wood to a cement floor which became polished by certain chemicals used in production. Experiments have been carried out over a long period with various substances for washing, chipping and other non-slip processes.

In accordance with Company policy, a divisional Safety Committee was formed. Films were used and every effort made through the normal operative training procedure to stress hazards and good safety techniques. In 1963 the factory as a whole had twelve lost-time accidents only (807 employees), and the severity rate is also low.

IV. MANPOWER ADJUSTMENTS

1. *Managerial staff*

The new hose plant had little effect on the organisation of the major part of the Company. It involved the appointment of a Production Manager, Assistant Superintendent and four additional supervisory staff. The planning, installation and initial production for the project affected mainly the service departments such as Industrial Engineering, Central Engineering and Production Planning, some of whose staff were seconded to this unit. Within a period of three years three Managers have been in charge. This was the result of the Company's desire to promote from within and probably stemmed from the difficulty which some technologists find in adapting themselves to coping with the pressures of Production Management. The third Manager an American with considerable experience of hose manufacture, is now in charge of the Department.

The Assistant Superintendent was appointed from the Company's Work Study Department; subsequently a second Assistant was promoted from the hose factory where he had originaly been engaged as an operator.

2. *Operatives*

During the period of change and since, there has been no difficulty in recruiting the additional men required from 98 to 158. For some jobs the Company attempted to find men who had some experience of components used in hose manufacture, such as handling wire.

It was agreed that all the men employed in the old hose units were suitable for transfer. Even the older men, many with long service, who might have found the job more onerous, were able to continue owing to the physically easier methods and the introduction of handling aids. These men were so skilled in the work required that they were invaluable to the Company; they formed the nucleus around which the labour strength of the hose factory was increased. It was unnecessary to transfer any of the men to other sections for any reason whatsoever, and there was no redundancy.

Considerable retraining was unnecessary for these men but they required knowledge in the use of handling aids. In some instances this was given by the foreman of the section concerned.

At least 95 per cent of the equipment was new and there were initial teething troubles commonly found in the operation of new plant. Operators on these new machines and equipment required some training, and output was initially lower than the recognised standard. In some instances, staff of the manufacturers of the machines assisted in this training, and a highly skilled man expert in the field of Braiding Machines was sent by the parent company in America.

It is the policy to prepare a job specification and safety analysis for all production operations. This is also used as a training plan. Foremen had been given Training Within Industry instruction and the Hose Manager had the overall responsibility for seeing that effective training was given. If a skilled operator, under the guidance of the foreman, is detailed to give instruction, his earnings are guaranteed. It is considered that a new man will require up to three months' training, but on the more complex types of hose this may take up to one year.

3. *Labour turnover and absenteeism*

Labour turnover in the original two small hose units averaged 24.6 per cent per annum. This rose in the year of the changeover and the year following to a maximum of 56 per cent, possibly due to the increased recruitment for the hose factory, where three-shift working is operated. Shift working is uncommon in the area, and although agreeing initially to work these hours, some men unaccustomed to this system of working considered the disruption of home and social life too great. By 1963 the labour turnover rate had fallen to 23.4 per cent.

The stability rate (men), i.e. the proportion of workers who remained with the firm, for the factory as a whole has remained at over 80 per cent for some years. The hose factory rate follows the same pattern and at the end of 1963 was 84 per cent.

No separate absenteeism rates are available for the hose factory but those for the plant as a whole are considered reasonable, between 2 per cent and 3 per cent for men and double this rate for women.

4. *Promotion prospects*

Opportunities for promotion have occurred because of the need for additional Managerial and Supervisory posts. Most operations have a leading Chargehand; this has resulted in 25 men having a different responsibility — for men as well as production.

V. WAGES

The Company is represented on the National Joint Industrial Council for the rubber manufacturing industry which establishes wages and conditions throughout the industry. Generally rates and earnings are above the minimum. These rates do not apply to other grades of workers such as maintenance men covered by agreement for craft occupations.

There is in operation a time and bonus system for over 90 per cent of the operatives. This system is based on the establishment of a value in terms of time for each operation. Earnings are determined by dividing the time allowed by the time taken which gives an efficiency; this is related to an hourly rate which is based on job evaluation.

During the period of changeover, and until studies were made of the new operations, the average of the previous hose earnings over the four weeks preceding the change was guaranteed. The Hose Standards Committee was responsible for all the arrangements regarding labour standards and payment. A considerable volume of information was prepared, including a detailed comparison of present and future earnings by occupation.

When the existing hose units were established in the new factory, and as new processes were introduced, studies were made, standards fixed and the rate determined. A chart was prepared showing the guaranteed rate until standards were established, and the rate applicable to the level of efficiency attained. The period of time for which earnings were guaranteed depended on the operation and the skill of the men; in approximately six months all the existing hose employees were on the new scale of payment. In order to preserve operatives' earnings, points were added on a diminishing scale for a period, depending on the nature of the operation.

Example - Man reaching 85 per cent efficiency on new job:

Period: 1st week + 20 points
2nd week + 15 points
3rd week + 10 points
4th week + 5 points

The period taken might be one month or more, dependent on the complexity of the operation.

VI. CONCLUSION

Consideration was given at every stage to the impact the changes would make on the men. Those who had worked in the original small hose units were encouraged to express their opinions regarding the job and conditions, and they have shown interest in the developments. Throughout the planning and development of the new hose factory, the Company analysed the demands and pressures that the new methods of work would make on the men. Forecasts and standards set were revised as necessary due to pressure for production, initial technical difficulties, and other changes of circumstances. Production and manpower planning were interwoven. Although there were differences of opinion, there was never an unsolved argument and no dispute was recorded.

Case V

MODERNISATION AND STAFF REDUCTION IN A DYESTUFFS PLANT

I. INTRODUCTION

1. *Company background*

The Company to which this study relates is part of a larger organisation which, in this country, is concerned with dyestuffs, pharmaceuticals, fine chemicals and plastics. In turn, the larger organisation has world-wide connections. This factor is of some significance when related to the technical changes later described in the report.

The Company was founded in 1876 and was one of the first firms in the dyestuffs industry. It is now well-known as one of the largest dyestuffs manufacturing concerns in the United Kingdom. The original factory site of one acre has grown into 54 acres and provides employment for about 1,200 people.

It is located in one of the older parts of Manchester, where there is a concentration of both industry and population. However, in recent years there has been a reduction in the insured labour force, which now numbers about 57,000. The principal industry is engineering and metal goods which accounts for about 25 per cent of the insured population. Chemicals and dyestuffs at present account for 6 per cent of the insured population. For a number of years, unemployment in the area has been lower than the national average.

A Personnel Department was established in the firm in 1921 and implements an enlightened policy in the field of human and industrial relations. The Department covers the whole personnel function, backed by a system of comprehensive personnel records. The policy may briefly be summarised as " To employ an adequate labour force, working at maximum efficiency under good working conditions, for the best possible rewards ". The Company enjoys a good reputation and this is reflected in the number of long service employees. At present, almost one-quarter of the employees have over 25 years' service and this number would have been higher but for recent developments.

The Company played a prominent part in the formation of the Chemical and Allied Industries Joint Industrial Council, of which it is a member. The functions of the Joint Industrial Council include the regular consideration of wages, hours and working conditions.

So far as the hourly paid workers are concerned, the wage structure is made up of the basic rate for the industry, plus the job evaluation award, plus a production bonus. Since 1955 a system of Measured Day Work has been in operation. Details of hourly rates and weekly pay are published on works notice boards. The notices also include the rates appropriate to the different systems of shift working.

There is a Shop Stewards' Committee in the Company on which are represented nine trade unions. Local negotiations are carried on almost exclusively at shop steward level. Both the Company and unions are proud of the fact that it is seldom necessary for full-time officials of the unions to become involved. Indeed, both sides regard it as a reflection upon themselves if they are not able to resolve a problem.

2. *The technical change*

The Second World War, with its aftermath of shortages and restrictions, imposed a pattern of " ad hoc " development on the Manchester site. However, as things slowly returned to normal, it became necessary to take a decision regarding the future of the Company. It was already apparent that trading conditions would be influenced by the European Common Market and the European Free Trade Association. It was equally clear that the Manchester factory would find it difficult to compete, with its old plant, machinery and buildings.

The multi-national group of companies to which the Manchester company belongs, eventually decided to completely modernise the factory site at a cost of approximately £ 11 million. Technical excellence, high quality, lower production and maintenance costs and a reduced range of products were primary objectives of the scheme. It was intended that the new manufacturing units would, in general, be much larger and more flexible.

Large modern buildings have now taken the place of small scattered units. Services such as power, light, steam, and transport have been redesigned and laid out on a site basis. The most modern plant and machinery has been installed, with a much greater degree of instrumentation and therefore of control. The heavy and in some cases dirty work has been largely eliminated by better methods and mechanical handling devices. They have been introduced to make the work more efficient, easier and more pleasant.

3. *Planning the change*

The management of the Manchester company is carried on by what is described as a Committee of Management which, to all intents and purposes, functions in the same manner as a board of directors. On the Committee are the top executives in the company who deal with production, engineering, administration, accounting, research and personnel. This Committee works as a closely-knit team. It meets formally once a month, under a director of the parent company, but it meets informally for a short period each day. In this way, each knows what the other is doing and problems are examined both from the specific and from the general points of view.

From the commencement of the modernisation scheme, there has been the closest collaboration and co-ordination between the top executives. The results of this are reflected in the development of the project which has proceeded smoothly, according to schedule and without any major or fundamental alterations. The extensive technical and research services of the Group were available to the Company and since information was based on worldwide connections, the importance and advantages of this facility are obvious.

Some of the early planning resulted in the erection of a new power house. This provides the essential services to the site and thus dictated the overall pattern of development. However, most of the planning started in 1957 and the work really got under way in 1959. It has to be remembered that this was not clear ground. The site was already covered by existing buildings, many of them very old, and it was essential to keep production going whilst demolishing old buildings and building new ones.

It was decided in the early stages of the construction programme to establish a site agreement between the Company and the appropriate trade unions. This agreement is comprehensive in nature, dealing with rates of pay, working conditions, etc. It includes provisions relating to trade union activities, and also a procedure for the settlement of disputes which, if necessary, would be referred to the Ministry of Labour for settlement. A copy of this agreement was given to all contractors and sub-contractors taking part in the construction and the Company obtained an undertaking from them to carry out the terms and conditions thereof. As a result there was a complete absence of industrial trouble and the work proceeded according to schedule.

4. *Assessment of manpower requirements*

It was possible to plan the required labour force with some accuracy. To the Group's experience on similar projects in other countries was added the work of the Company's Work Study Department. Further, for some time a Job Evaluation scheme had been established and there were thus available job specifications and a great deal of synthetic data. It was therefore possible for the Company to plan well in advance and to relieve any hardships that were apparent.

The following table shows the labour force since the modernisation scheme began. The reduction in staff not only reflects the relationship with hourly paid workers, but is also the result of improved accounting and clerical methods. The target for 1965 is only an estimate and this may be affected by future trading prospects:

YEAR	STAFF	HOURLY PAID WORKERS	TOTAL
1959	419	1,135	1,554
1960	408	1,041	1,449
1961	399	1,031	1,430
1962	386	925	1,311
1963	329	858	1,187
1964	312	837	1,149
1965 (target)	250	650	900

II. INFORMATION AND CONSULTATION

It is the declared policy of the Company to keep workpeople and their epresentatives fully informed.

A Works Council has been in existence since 1945 and Joint Production

Committees since 1951. Minutes of the meetings of these committees are posted on Works Notice Boards. The Shop Stewards' Committee is also used for communication as well as negotiation. This committee has its own notice board.

Immediately following the decision to adopt the development and modernisation programme, a Director of the Group informed the Departmental Managers and senior administrative staff. Thereafter, the senior executive responsible for the personnel function was given the responsibility of informing the remainder of the employees. The Works Council (consisting of seven persons appointed by the management and eight employee representatives) was also informed, and to assist in the explanation, large-scale models of the project were made available. The vice-chairman of the Works Council is a shop steward and he has served on the Council for 16 years. He confirmed that consultation has taken place at all levels. He said that the improvements which had taken place " were almost beyond belief ". He claimed that the Council " was a big factor in the Works. It helps to decide things and the fact that we are asked instead of told makes for a better working life. It also makes for a better home life, as you don't go home feeling sour and bitter ".

After the Joint Production Committees and the Shop Stewards' Committee had been given the relevant information the remainder of the employees were informed at a series of meetings held during working hours. They were told about changes in layout, manufacturing methods and the labour force. It was also explained how the Company would deal with redundancy and special classes of workers such as the elderly and disabled.

Throughout the whole project, progress reports have been given at all levels. No special notices were prepared. The information was recorded in the minutes of the appropriate committees and displayed on works notice boards.

The Chairman of the Shop Stewards' Committee is also a member of his Union's Executive Council. He confirmed that the various trade unions had been kept fully in the picture.

The evidence suggests that Joint Consultation in this Company is a normal feature and is regarded by management and workers as a practical asset.

III. REDEPLOYMENT PROCEDURES

The Company's policy in regard to employees is, so far as possible, to create a stable labour force. Under the development and modernisation programme the objective has been a somewhat smaller, flexible and more efficient force. The reduction in numbers resulted from the introduction of new equipment. Most of the reduction has been achieved by retirements and normal wastage. Recruitment was stopped and will only be resumed as and when necessary. It is established Company policy that, in the case of inevitable changes, no hardship would be inflicted on any employee.

1. *Selection*

In respect of the modernisation programme the Company's policy was, so far as possible, to use the existing labour force. Since there was a surplus of labour, the problem of recruitment did not arise. However, some care was necessary when selecting existing hourly paid workers for the new jobs.

The responsibility for selection was shared by the Plant Managers and the Personnel Department.

In the past, the Company has never experienced any difficulty in recruiting workers and for many years labour turnover has been very low. Allied to a comprehensive system of personnel records and job evaluation, this meant that a great deal of information was available concerning the present labour force, and therefore management was in a good position to weigh and decide.

It was clear that some of the older workers were steeped in tradition and past practice. They were not so adaptable as workers in the lower age groups, moreover they were apprehensive about the new machinery with its high degree of instrumentation. The new jobs undoubtedly required a greater degree of concentration. Responsibility was also increased because the new production method involved much larger batches and quantities, and any spoilage would therefore cost a great deal of money.

All these factors were taken into account when selecting workers for the new jobs. The policy was to select the best man from the existing labour force, having due regard to age and adaptability. At the same time, the Company had in mind the age structure of its future labour force.

Normally, hourly paid workers are screened by the Personnel Department before submission to line management. The interview is the main factor of selection, supported by case history and any personal recommendations from the existing labour force. A medical examination by the Company's part-time doctor is a condition of employment. Other conditions of employment are printed on the application form. Tests are given to craft apprentices and, where appropriate, tests are also given for colour blindness. As regards staff, conditions of employment are outlined in a staff handbook.

For all new workers a progress report is issued to departmental managers. For each week during the first month, the employee is assessed for timekeeping, conduct and ability. Further reports are called for after three and six months' service.

2. *Training*

The policy of the Company is a system of training on the job with the object of creating an efficient, flexible and mobile labour force. In fact, a recent change in the Job Grading scheme is designed to increase this flexibility and mobility. The responsibility for training production workers is vested in the Departmental Manager, again working in close collaboration with the Personnel Manager.

So far as the modernisation programme is concerned, the practice was to put Departmental Managers and their senior staff into the new buildings in the early stages of erection. Thereafter, they collaborated with the Company's engineering staff to ensure that the erection of plant and machinery was in accordance with the Company's specification and requirements. This of course, was a great advantage in itself, but the procedure also provided a good opportunity for the training of Technical Officers. This is a new grade, corresponding to that of foreman under the old system. These Technical Officers were selected for their supervisory abilities and are expected to obtain the Higher National Certificate. They are responsible for training the production workers on the job. In some cases, they have been " trained to train ", using the system of Training Within Industry sponsored by the Ministry of Labour. Quite often, the learner is put with an experienced operative, but the responsibility for training still remains with the Technical Officer.

As a result of modernisation, many jobs have been greatly simplified and their performance is aided by a job card giving simple, concise and easy to follow instructions.

3. *Redundancy*

Production and cost studies had revealed that the manufacture of certain basic and/or intermediate materials was uneconomic and the Company decided not to erect new plant for these products. This necessitated an immediate placing of long-term contracts for purchase from outside sources, which meant that early in 1959 about 100 hourly paid workers became redundant. The Company's policy was that no one with over 15 years' service would be made redundant and that otherwise, with some minor qualification, selection would be on the basis of last in — first out.

Three months' warning was given to the workers concerned. They were given every assistance, including time off, to find alternative work. Advance registration was made at the Local Office of the Ministry of Labour so that the workers could be placed in alternative employment. The Company also contacted firms in the Employers' Association and invited their cooperation. Severance pay was given on the basis of a week's earnings for each year of service, with a minimum of three weeks' pay.

This redundancy took place early in the redevelopment scheme. Later development caused redeployment of workers but no redundancy.

4. *Alternative work*

The Company has the reputation of looking after its older employees and this has been confirmed by employee and trade union officials. It is normal practice, in the case of employees who cannot continue in their usual job, to try and find them alternative work. This is not always easy, for a variety of reasons. An elderly process worker said, " I don't suppose I shall be able to cope with the new job, but I know they will find something for me ". However, he was clearly pround of being a process worker and was anxious in case the alternative work had not the same prestige. He explained that recently he had visited a sick comrade, also a process worker, who had said he was also worried about it being " a man's job ". So, in fact, was his wife.

5. *Retirements*

There has been a contributory Staff Pension Scheme since 1922. The retirement age for men is either 60 or 63, dependent on the date of entry into the scheme, and for women is 60 years of age. Until 1957, hourly paid workers were dealt with on an ex-gratia basis, but since that time, they have had a contributory pension scheme.

A shop steward is a director of the Company's pension scheme and also a member of its investment panel. He said that whilst the men were grateful for the generous treatment under the ex-gratia scheme, they welcomed their own pension scheme as a right. Another shop steward said "that there was now something to look forward to in the shape of a decent pension".

The scrapping of old buildings and the concentration into fewer, larger and modern buildings inevitably meant that some senior staff were surplus to requirements. Many of these were at or near retiring age and they were, in fact, encouraged and helped to retire. In some cases, redundant staff were paid full salary until they reached the actual pensionalbe age.

IV. RESULTS

The expenditure of £11 million has resulted in large-scale and dramatic changes. One of the most remarkable results has been the increase in labour productivity of about 140 per cent. A main objective of the plan has been to increase efficiency rather than output. Other considerations apart, this was essential to absorb the steady rise in manufacturing costs, whilst keeping prices stable. In fact, the Company has not increased the prices of its products in the last seven years. Indeed, in some cases, they have been reduced. Another significant factor is the remarkable increase in the Company's investment per person employed. This has risen from £3,307 in 1957 to £10,681 in 1963 and on completion of the project will rise to about £13,500 per employee.

There is clear evidence that salaries and wages have increased as a result of the development and modernisation scheme.

Case VI

SWITCH TO COMPUTER ACCOUNTING IN ENGINEERING

I. INTRODUCTION

1. *Background to the project*

The Company is an engineering company, and the Division under discussion employs 1,200 manual production workers and 1,200 clerical staff. The study is concerned with the introduction of a computer into the organisation to undertake accounting processes which were already partially mechanised. The complete changeover took from three to six months.

The complexity of the business had reached a stage where manual processing of information was proving inadequate. Moreover, to have continued to do the increasing volume of clerical work manually would have necessitated an increase in staff of 100 per cent in the section concerned. In the existing labour supply conditions there was already great difficulty in engaging suitable staff. On both counts therefore, increasing complexity of the work and recruitment problems, the need to mechanise was apparent.

The present Head of the Computer Systems Division (previously Head of Organisation and Methods Division) began thinking about the advisability of introducing a computer 18 months before putting his plans formally to the Board. The Board was, however, at all times fully aware of the situation, and therefore when the formal proposals were put before them their acceptance of the proposition was a formality.

2. *Installation of the computer*

The original plan catered for the basic known requirements at that time, but when the Heads of Divisions found the results satisfactory they increased their demands. It was for this reason that a second computer had to be installed.

Both the first and second computers installed were standard products on the market, but because of the nature of the work required, the Company was not able to draw on the experience of other users. They were the first computer users in this particular field and therefore careful planning was necessary. The computers were both installed by the manufacturers.

It was planned that during the changeover period the two systems should run concurrently with a gradual transfer of work to the computer section by section. Each changeover took between four and six weeks to complete, but no section changeover was regarded as completed until the " customer " (the section head) was quite satisfied with the changeover.

When plans for the changeover had been completed, the Head of the

Computer Systems Division reported to the Board and he then began individual negotiations with Heads of Divisions. In some cases there was initial and continuing resistance from Heads of Divisions. They were bound only to a certain degree by the Board's decision, and were required to use the computer only if the requirements of their department were compatible with electronic data processing and if the use of the computer would improve the business. The only way to success lay in proving to the Head of a Division that the service was valuable, and in producing results which could be assessed. This was the most difficult part of the service in the early stages, as no financial return could be claimed by the Computer Systems Division until the Head of each Division had been convinced of the value of the service for his particular work. It was essential therefore that the service given should be seen to be first class. Contact with the Heads of Divisions has been maintained not only during the introduction of the new service but as a continuing process.

Following the decision to install a computer, the Head of Organisation and Methods Department took charge and was designated Head of the Computer Systems Division. The Division itself was divided into three parts (a) Electronic Data Processing (b) Technical Methods and (c) Clerical Systems, but operated as an integrated whole.

3. *Manpower planning*

The Head of the newly formed Computer Systems Division was responsible for the manpower planning in detail and because meticulous care was taken over this prior planning no major alterations were necessary in carrying out the plan.

No experience was available either from the computer manufacturers, or from a pilot project within the plant, and no outside consultants were used. A feasibility study was prepared which showed the breakdown of the proposed labour force by function and by operating groups for each stage of the conversion programme. The changeover was budgeted in each section of each unit dealt with. The absence of information from outside sources about manpower requirements gave this feasibility study an added significance.

Estimates of manpower requirements were based on an analysis of the manpower required to cover all existing functions, the planned application of the computer and an assessment of the skills and of the numbers of staff required to run the computer. After consultation with other members of the staff on all these points, the final staffing estimates were produced.

About 130 staff were affected by the project. These had to be transferred and, in many cases, retrained. There was no redundancy.

II. INFORMATION AND CONSULTATION

After the master plan for Manpower Requirements had been drawn up, it was clear that there must be a rundown in one area and a transfer of some people to other work. Some of these could be used in the Computer Systems Division, and they were informed that they could be retrained for a new job. It was at this point that the Company announced officially that there would be no redundancy due to the change from manual to computer accounting. This was the most difficult point in the changeover, for if the information had not been given at once many of the best people would have been lost at the outset.

All the clerical staff involved in the change were informed of the news as soon as the computer delivery date was known; at that time the date was about six months ahead. This policy was continued for each extension of the programme.

The trade union concerned was informed that a computer was to be installed. No difficulties were encountered, probably because at a very early stage the Company had made known its policy that no redundancies would take place. In every section this policy was made well known in advance, and in most cases there was a six months' breathing space for re-arranging staff duties.

At an early stage the Head of the Computer Systems Division held a meeting with all the clerical staff and informed them of the Company's plans. In addition, the changes, as they affected employees' existing jobs, were explained in a series of small meetings, where the people present were invited to volunteer and be retrained for computer work. Each section was given one week to think the matter over. In a few cases members of the staff at first refused, and then returned to ask if they might change their minds, and were accepted for retraining. Those who did not wish to join the computer team were assured that, according to their own wish, they would be placed elsewhere in the Company, of if they possessed some special skill they would be assisted to find jobs outside the Company.

The Company operates a Joint Staff Council which holds regular meetings. The Council was informed of the Board's decision when the first section meetings of clerical staff took place. It was however felt that, because of the importance of accurate information being passed down, it was essential for the Head of the Computer Systems Division to make himself responsible for the dissemination of information by talking to all the clerical workers concerned in the changeover in the small section meetings referred to above. In spite of this some rumours did later arise, but they were quickly dealt with by personal contact with the individuals concerned. It was felt to have been of great advantage that the Head of the Computer Systems Division had for many years been well known to the staff concerned when he was Head of the Organisation and Methods Division. The Line Managers in the sections concerned played a full part in continuing the dissemination of accurate information to their own staffs following the meetings with the Head of the Computer Systems Division.

The only grievances which arose were questions of " How will this affect my job "? These came from members of the staff who were very attached to their own job, and who, long before the proposed changeover, looked upon a change from one machine to another as a cause of grievance. Most of these difficulties were overcome by individual interviews with the Head of the Computer Systems Division. He was convinced of the value of this personal contact.

As soon as it was possible, all the staff who might be involved in the changeover were given the opportunity of seeing the computer installation so that they could fully appreciate the importance of the new work.

It was not found possible to locate the data processing girls in the same building as the computer itself, and therefore once a year the data processing staff are invited to visit the computer building to see the installation and to have tea with the computer staff. After the first visit there was an increase of 50 per cent in the output of the data processing staff.

III. MANPOWER ADJUSTMENTS

1. *Transfers*

In preparation for the installation of the computer, and following the clerical sections' meetings with the Head of the Computer Systems Division, the following steps were taken:

a) All staff were given the opportunity to join the computer team. Those who accepted were given training in the appropriate grade for which they were suitable. Some of the National Cash Register Machine operators (the largest single group replaced) were given the option of either being placed in similar work in another section of the Company, or of being assisted by the Company to obtain similar jobs in other Companies. Twelve of these operators were placed outside the Company at their own request.
Most of the affected people who could not be used in the Computer Division were either transferred to other work in the Company, or left through natural wastage. About 2 per cent of the clerical staff directly concerned proved to be intractable problems. This 2 per cent was taken care of by allowing an old job to continue where the people concerned were close to retirement, but nobody was declared redundant.

b) When it was known how many of the affected staff wished to join the computer team, the internal advertisement system was used, and applications for computer jobs were invited. The records of the applicants were studied before interviews took place, and after the interviews the release of the successful applicants was negotiated with the Heads of the Departments concerned through the Personnel Department. The jobs have been made attractive from the salary point of view and generally speaking the staff are paid at a higher level than the average in the Company.

The new labour force for the computer system did not change in number by comparison with the team who operated the old system, but the people changed and the age content changed.

2. *Composition of old and new working groups*

At the time of its installation the team for the first computer was made up as follows:

	2	Management
	4	Programmers
	5	Computer operators
	1	Supervisor
	35	Lower Clerical Grades on Data Processing (mainly 16-20 years of age)
Total	47	

In the area affected by the computer application the staff had previously consisted of the following:

62	National Cash Register Machine Operators (trained by NCR Schools)
34	Accounting clerks (men and women) with some skill but no special training
35	Women clerks of lower clerical grade with no skill and no training (mainly around 35 years of age)
Total 131	

Part of the 131 were transferred to the Computer Division, others were transferred inside the organisation and a number remained in the same department to continue other work.

The Computer Division has increased its strength considerably since the first computer was installed and is still increasing as more programmes are placed on the computer. This has resulted in great opportunities for promotion.

3. *Personal qualities required in computer staff*

In making the selection of the first employees for the Computer Systems Division it was realised that it was very important that the employees chosen should fit the job requirements. Personal relationships in the computer team must be good. Personal qualities and technical skill are equally important, and all the team must work together, for dissension could be fatal to the work of the whole Division.

The main skill in the computer area was judged to be the programming of the machine, and in this category men and women with secondary modern and grammar school education were accepted as well as University graduates, engineers and accountants. Efforts were made to define the qualities required in a good programmer. It was not considered essential that he or she should be mathematically minded (this would only be necessary for programmers dealing with scientific programmes) or a qualified accountant; a programmer must be able to look at a project in outline, to understand the Company's business and at the same time to be able to analyse the requirements in the most pedantic and detailed way. He or she must be enthusiastic about the job and be prepared and able to work under tremendous pressure at any hour, any day, and virtually live with the job.

The Head of the Computer Systems Division believes that the useful life of a programmer is between five and seven years after which they would either have the opportunity to become a supervisor on the computer or to be transferred to other work within the Company. Most of the programmers so far employed (men and women) have started at age 24-25 and would normally move to other jobs at the age of 31-32. In this Company both men and women programmers have been employed, no differentiation has been made between them, and both have been equally successful.

Although the quesition has not in fact arisen, disabled people would have been given exactly the same options as any other staff of joining the computer team, being transferred within the Company, or of being assisted to find similar work outside the Company.

IV. TRAINING

A special training system was devised and carried through by the Head of the Computer Systems Division and his assistants.

1. *Programmer training*

a) A training course of three weeks in machine language followed by a test. The test *must* be passed.

b) Trainees who pass the test in the first course have further training on actual programming under close supervision within the programming group, followed by a test. This test *must* also be passed.

c) As a result of the passing of parts (*a*) and (*b*) men and women are accepted as programmers.

Labour turnover has been most frequent amongst men and women who are "lone wolves" and who do not fit into the programming team.

In the normal way the Head of the Computer Systems Division would prefer to train young people in the age group 21-25 and with not less than University entrance standard in any subject. Some successful programmers have, however, come from occupations where no opportunities for academic achievements have occurred. Many of the programmers study in their own time to achieve specialised programming skills, but the main training is on the job.

2. *Computer operator training*

Training is given on the job. There are three categories:

a) Trainee operator,
b) Operator,
c) Shift supervisor.

The trainee operator spends three to four months as a trainee on the job under close supervision, and is then tested. This test *must* be passed. Those who do not pass receive no further training, but if they have been specially recruited from outside the Company for the job, they can be considered for work elsewhere in the Company. In practice, however, it has been found that many trainee operators specially recruited from outside the Company for the section prefer, if they fail the test, to seek similar employment elsewhere. Trainee operators who pass the test are then given employment in the computer area as operators, having become operators they by ability become shift supervisors.

Shift supervisors become eligible for training on the Programming Course. If they fail, they return to their job as shift supervisor without loss of face, as it is recognised that programming is a job at present without any known criteria for success. All staff in the computer area are eligible for promotion.

3. *Data processing staff*

These are girls mainly 16-20 years of age, mostly from secondary modern schools. Initially they were transferred from within the Company. When additional recruitment took place it was from both internal and external sources. They are trained on the machines and on the job by the supervisor. Training lasts from three to six weeks. Supervisors come up from the ranks, and because young women are employed, natural wastage is high. There are good opportunities for promotion.

V. SALARY STRUCTURE FOR COMPUTER STAFF

The Company established a new salary structure for the new skills in the computer installation. All the trainees retained their old rate during training, and after the completion of training went on to the rate for the job. After the changeover 50 per cent of the people affected by the change had better pay and better jobs. The people who did not join the computer team and were transferred elsewhere suffered no loss in earnings.

VI. EFFECTS OF THE COMPUTER INSTALLATION

Whilst no actual savings in final staffing were made the business has gone on increasing so quickly that comparison is difficult. The Computer Division has increased its strength considerably since the first computer was installed; the volume of work has trebled, and information is available which was not available under the old system. The volume and speed with which the information is now available needs to be stressed and also the fact that business has increased because of the information quickly available from the computer.

As far as Company organisation is concerned, the computer has not basically changed the structure, but some Divisions have gained in importance at the expense of others, as was foreseen. In the pre-computer period accountants produced the information, but now the computer produces it. (The displaced accountants were given alternative work within the organisation on the same basis as the rest of the staff.)

In the computer area physical working conditions were much improved, but hours and conditions of work were worse, due to shift working and overtime. Shift working is undertaken by the computer operators, shift supervisor and maintenance engineers on a seven day per week, three shift basis. In addition, programmers are called upon to run their programmes through at all hours of the day or night depending upon the availability of the machine. Although they do not work shifts, the average overtime of programmers was initially 70 hours per month, and overtime is still being maintained at a fairly high level when additional programmes are being prepared. Compensation is by way of increased salary and an absorbing job, and those who like the job have opportunities for advancement they could never have hoped for previously.

There is normally little absenteeism. Because of the high cost of computer work no spare staff can be carried, and the danger is that any large scale sickness absence, e.g. an influenza epidemic, can bring the whole of the work to a standstill.

Chapter VIII

UNITED STATES

INTRODUCTION

The three United States cases cover varied industries. One relates to the introduction of data processing equipment in a government agency; the second, the substitution of dial for manual telephones and the third covers the progressive introduction of new equipment, including advanced computer controls, into a petroleum refinery. In all three cases the technical innovations resulted in far-reaching internal changes and, in the first two, employees were also involved in geographical relocation.

The first two studies were prepared by the United States Bureau of Labor Statistics of the United States Department of Labor on the basis of plant visits, an intensive study of the records and an interview with management and union officials[1]. The third was prepared by Roy B. Helfgott of the Industrial Relations Counsellors Incorporated, New York, who rearranged the material collected in the course of a broad study of the problem to meet the requirements of this analysis[2]. The latter study was made on the basis of field work and discussions with management representatives of the company.

Both the reports in the Internal Revenue Service and the telephone companies provide detailed insights on the planning process; they each involved a single sweeping change over a period of time and the managements concerned set up specific procedures for planning their manpower adjustment and adapted their innovations in part to the exigencies of manpower problems. In all three instances consultation was maintained with the employee representatives and the adjustments made to some extent took account of their suggestions. Since the telephone companies had had prior experience with these innovations, the procedure for dealing with these problems was well established although adaptations were made to suit local needs.

The objectives were precisely defined in all three cases and sought to minimise the adverse effects upon the persons either in the form of loss of job, downgrading, or relocation. In the Internal Revenue Service case, specific changes were made in established personnel regulations to meet the special needs and protect the employees' interests.

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[1] A full report on the case of the Internal Revenue Service may be found in " Impact of Office Automation in the Internal Revenue Service ", United States Department of Labor, Bureau of Labor Statistics Bulletin No. 1364, Washington, 1963. See also " Manpower Planning to Adapt to New Technology at an Electric and Gas Utility ", a case study, United States Department of Labor, Bureau of Labor Statistics, Report No. 293, Washington 1965.

[2] Richard A. Beaumont and R. B. Helfgott. Management Automation and People. Industrial Relations Counsellors, N.Y. 1964, 372 pages.

Due to the radical changes in occupations, many transfers were made in all three cases and retraining was an established part of the procedure. Internal retraining programmes were arranged to assist employees master the new jobs. New training techniques, including programmed learning, were employed in the refinery. Careful studies were made of employees' qualifications and background to assure appropriate assignments.

Among the measures taken to effect the adjustment were relocation, restriction of recruitment, and use of temporary appointments. Some employees accepted early retirement rather than transfer or reassignment. Because of the large number of women employees in the Internal Revenue and telephone cases, the adjustment programmes were facilitated insofar as natural wastage was concerned, but the difficulties for relocation were increased. Both the telephone companies and the refinery report that they organised programmes for assisting employees to secur jobs in other enterprises. Termination allowances were also paid to some employees.

A high level of employment in the communities in which the changes took place greatly facilitated the operation of the programme.

Case I

IMPACT OF OFFICE AUTOMATION IN A GOVERNMENT SERVICE

US Internal Revenue Service - Atlanta

I. INTRODUCTION

The introduction of automatic data processing by the Internal Revenue Service (IRS) was a continuation of efforts over the years to find ways of handling more efficiently a growing volume of tax returns and documents. The decision to install ADP was reached in March 1959, following more than a year of extensive exploration of technical feasibility by IRS planning experts. The changeover involved establishing a comprehensive data processing system, requiring the introduction of electronic computers, a taxpayer identification system, a centralised worker file of taxpayer accounts on magnetic tape, and significant changes in organisation, manpower and work flow. The final plans provided that many of the routine data processing tasks in 62 district offices would be centralised and processed on computers at 7 new regional computer (or service) centres and the National Computer Center at Martinsburg, W. Va, and that 4 district offices would be eliminated. Enforcement and public information and assistance activities will remain in the district offices. The new data system is expected to result in the processing of a much greater workload without a commensurate increase in employment and to lead to more efficient and effective enforcement of tax laws.

This report highlights the first stages of conversion to ADP in the Atlanta region, comprising seven Southern States. The regional office, regional service centre, and a district office are in Atlanta, and there is a district office in a major city in each of the other States. Nearly 4,000 IRS employees worked in these 7 district offices in July 1961; about 1,000 worked in units which would be directly affected by ADP. These affected employees were primarily older women with most of their working experience in Government. Their duties mainly involved manual processing of tax returns. The remaining 3,000 employees, who were only indirectly affected, worked in enforcement and public information and assistance activities. Of the jobs directly affected, the IRS estimated that nearly 500 will be eliminated by July 1966. Although a greater number of jobs are being created in the Atlanta regional centre, many require different skills. Moreover, all are located outside the commuting area of most affected employees. The impact may be cushioned since about one-fifth of the affected group was eligible (in January 1962) for a retirement annuity.

During the first 2 years of the changeover (July 1960-July 1962), permanent employment in affected units was cut back by 234 employees or 22 per cent, partly by natural wastage and partly by reassignment of employees to other jobs in enforcement and public information and assistance work, not directly affected. Of the reassigned employees, 90 relocated in another city. Nearly all moves were less than 500 miles. No employee was laid off.

II. PLANNING TECHNICAL CHANGES

The conversion to an automatic data processing system required considerable advance preparation. A preliminary plan for the whole service was ready in December 1958. The approval of Congress for the final plans was obtained early in 1960.

The first computer in the Atlanta Service Center was installed in August 1961; the second in March 1962. In September 1961, 3 months prior to the initial processing of business returns, a large system was installed in the National Computer Center.

The application of ADP to tax information handling required more than the replacement of conventional methods with electronic computing equipment. The " total systems approach " to data processing was adopted, and plans were made for extensive changes in work flow, services to taxpayers, and location of jobs. In short, the introduction of ADP required a review of the total functions and organisation of the entire IRS.

The important technical and procedural features of the system are:

a) a three-year master file of taxpayer accounts, stored on magnetic tape at the National Computer Center;
b) a system of taxpayer identification by numbers;
c) increased centralisation of routine data processing with much of the processing diverted from district offices to regional service centres.

The new system involves substantial shifts in the location and nature of jobs. Employees in the district offices will perform only limited operations before documents are sent to regional service centres. These preliminary tasks include checking returns for name, address and account number; depositing and accounting for remittances, and establishing and maintaining initial accounting controls. At the regional service centre, employees will transcribe data to punched cards, convert the data to magnetic tapes, and ship the tapes to the National Computer Center where they will be entered in the master file. After the output tapes are returned to the service centres, high-speed printers will post the information to bills and notices to be sent to taxpayers, lists of returns for audit, and other control documents.

The ADP plan differs radically from the previous system, where processing work on returns was performed manually at each district office by workers using typewriters and adding and book-keeping machines, or at three area processing centres. By using electronic computers, many accounting entries that are now mechanically or hand posted will be eliminated.

The IRS also made major organisational changes to provide a new administrative framework for the conversion. A new central ADP Division was organised in January 1961, with responsibility for all aspects of data processing plans and activities. Similar changes in organisation were also made in the Atlanta region.

An ADP advisory group was formed by the Atlanta Regional Commissioner, comprising the Assistant Directors from each of the seven district offices. This group analysed problems of the conversion and recommended practical solutions. The Regional Commissioner enlisted the active co-operation of local officials by having them participate in planning the change-over.

III. NEW MANPOWER REQUIREMENTS

1. *Overall employment gain*

According to tentative IRS projections of occupational requirements, the new system will result in significant changes in employment and occupational structure. Although it was expected that 479 jobs in affected units of district offices would probably be eliminated during 1960-66, over 900 new full-time jobs in the Atlanta Service Center are planned by 1966. If projections are realised, this will result in a net employment gain of more than 40 per cent in affected units and the service centre combined. More than half the employees in the service centre will process documents and perform other duties similar to those previously performed in district offices; the remainder will consist primarily of card punch operators, ADP personnel and administrative staff.

This larger work force in Atlanta will be able to perform a much larger workload than was accomplished manually, and will provide more precise checking and control.

2. *Expanding occupations*

The category of jobs expected to grow fastest is keyboard and other machine operators. This group will likely grow by nearly 300 per cent by 1966 and its relative importance will be increased sharply, primarily because of the need for large numbers of card punch operators at the Atlanta Regional Service Center to transcribe data for computers. Card punch jobs were not needed before ADP. The number of machine operators in the district offices will be reduced as work shifts to the service centre.

Three other occupational groups expected to increase relatively more than total office employment between 1960 and 1966 are: public information and assistance, correspondence, and examining and statistical. Groups that are expected to increase less than total office employment are: higher grade supervisory, stenographic and secretarial, administrative, and sorting, routing, classifying, and filing.

3. *Declining occupations*

The number of lower grade supervisory jobs and jobs related to posting, checking, and maintaining records, even when considering those established at the service centre, will be significantly reduced. About 60 per cent of the 186 jobs involving posting, checking, and maintaining records will be transferred to the service centre from the districts, and the remaining jobs will be abolished. The proportion of supervisors to total employment in affected operations is likely to decline from 18 to 12 per cent, although the average level of supervisory grade will increase slightly because of such factors as wider span of control and larger number of subordinates.

4. *Definition of required manpower adjustments*

Early in the conversion, the IRS affirmed its obligation to minimise adverse effects on the job security of employees. This decision was one reason for introducing automatic data processing gradually over a period of years.

The exploratory phase of manpower planning began in February 1960. Personnel staff members from the national office were assigned full-time responsibility for estimating the extent of the impact on employees, and for anticipating problems. The group was asked to develop procedures for eliminating jobs in units where the work was transferred to a regional service centre. They were also charged with developing measures to minimise hardship to employees without causing serious disruptions of continuing operations.

This phase of planning proceeded at the Atlanta region in several stages. First, the study group projected the tasks that would remain in the district office and the staffing patterns that would be required after the regional service centre opened. From these projections, they identified positions to be eliminated or changed. The group spent several weeks in on-the-scene investigations of two district offices. They estimated the number of potential vacancies from natural wastage and new job opportunities in the regional service centre. Working with individual employee records, they considered a variety of placement possibilities and training needs for each affected worker. On the basis of experience at the two offices, the study group developed a detailed plan to guide officials in the other district offices.

The next step was to extend planning to all offices in the Atlanta region. Several months prior to the conversion, the study group, together with regional and district officials, developed staffing projections for each office and identified jobs likely to be eliminated or changed in grade.

As the manpower implications became clarified, IRS officials realised that modifications in civil service procedures would be needed to facilitate the changeover, and undertook negotiations with the Civil Service Commission to achieve more flexibility. Regional Civil Service officials were kept continuously informed and actively participated in the conversion programme.

IV. COMMUNICATIONS WITH EMPLOYEES AND LABOUR REPRESENTATIVES

The IRS decided at an early stage to keep all employees informed of the progress of the changeover and its implications for job security. Thus, District Directors notified their employees as early as 12 to 18 months before any work would be shifted.

During 1961 and 1962, directors issued memoranda to all employees explaining the conversion progress. Articles were also published in newsletters and employee organisation publications. Meetings with affected employees were held to discuss problems of the change. The information dealt mostly with career opportunities in ADP training opportunities, and personnel policies to ease the impact on affected employees. It was also explained that unknown factors would undoubtedly result in later revisions of the staffing projection.

In addition to informing those directly affected, the IRS national office undertook to keep all field employees informed concerning the personnel implications and the progress of the change. A 4-page periodic bulletin, *ADP News*, described job opportunities in the ADP programmes, retraining of displaced employees, and progress of the installation in each region A sound and colour film, *ADP and You*, portrayed new employment opportunities in the programme. A 15 minute film strip, *Let's Get Down to Brass Tacks*, about the conversion's personnel impact and procedures to aid affected workers, was shown in all district offices in the Atlanta region.

Although formal collective bargaining in the Federal service had not been established, employee organisations were consulted. At the regional and local levels, employee groups were informed at an annual conference between regional management and employee representatives, and by periodic district meetings. These meetings provided a means for informing employees and also a channel of communications from employees.

V. PERSONNEL REDEPLOYMENT PROCEDURES

Responsibility for administering the policies to protect job security was placed on key officials of district offices. To assist these officials, a personnel co-ordinator travelled extensively within the Atlanta region, consulting with and advising managers in carrying out the policies.

1. *Reassigning displaced employees*

The IRS relied heavily on encouraging employees in the affected office units to seek voluntarily the permanent positions that were opening up, particularly in the regional service centre. The approach was to try to place in available job openings all individuals who must be reassigned, without using formal seniority and reduction-in-force procedures that are usually applicable when jobs are abolished. Major emphasis was placed in assigning each employee to a suitable productive job, at the same or a better grade, if possible.

A complete account of experience, education, qualifications, retirement plans, and ability to relocate was compiled for each employee affected. It was based on records, interviews, and questionnaires. During the interviews, officials counselled employees about their job security and the advisability of taking training needed for available jobs.

Office managers estimated the extent to which employment would be reduced by quits, deaths, and retirements. It was readily apparent that these sources would not take care of all employees in surplus jobs. Transfer to jobs at the newly created regional service centre, and to district activities not directly affected by automation, became the principal means of placement for displaced workers. For many, this involved retraining and/or relocation to another city.

IRS also made efforts to find jobs for some displaced employees in two other Federal agencies.

2. *Measures to facilitate placement*

To facilitate placement of employees who demonstrated potentialities for particular positions but who lacked formal qualifications under civil service standards, the IRS obtained from the Civil Service Commission special authority to waive certain formal requirements. Some employees who did not fully meet normal CSC standards followed a personal development plan, arranged by supervisors, to improve their qualifications for their job.

One procedure for reassigning displaced personnel without disrupting tax collection activities was temporary reassignment of unaffected employees from permanent jobs to jobs scheduled to be abolished. Affected employees were also detailed to continuing jobs for training before transfer. In addition, the Civil Service Commission approved the procedure of engaging new employees with qualifications in two fields of work — first in a job to be abolished and then in an unaffected job.

Affected employees who requested transfer to the service centre were given preference if they had a satisfactory work record and were recommended by their supervisors.

3. *Early retirement of displaced employees*

Older employees with many years of service whose jobs were eliminated had the alternative of " discontinued service " retirement instead of transfer and reassignment. To be eligible for these benefits, employees must have had at least 25 years of service, or must be 50 years old or over and have 20 years of Federal Service. The annuity was reduced for employees under age 60. No employee was forced to retire.

4. *Use of temporary appointments*

Authority was obtained to recruit temporary employees for periods up to three years, instead of the normal one year. These employees were used, for example, to fill the gap when permanent employees were reassigned before their old jobs had disappeared, and also to reserve vacancies for permanent employees who would later be displaced.

As supervisors and higher grade employees were transferred, some remaining permanent employees were assigned to high grade duties until such jobs were eliminated. They were paid the appropriate rate for the higher level of work, but to avoid jeopardising the rights of other permanent employees, their promotions were temporary.

5. *Restriction on recruitment*

In July 1961, offices in the Atlanta region began to restrict permanent recruitment for jobs which could be used directly or indirectly to place affected employees. The freeze, however, did not apply to jobs requiring scarce skills for stenographic, professional, and technical work.

6. *Recruitment and selection*

The general policy of the IRS was to select employees from within the Service for ADP positions. Employees were recruited from other Government agencies and private industry only when qualified applicants were not available from within the Service.

Candidates for programmer trainee positions were solicited from among all IRS employees. The selection procedure involved a series of steps including written tests and an interview by a panel. Employees from affected units were given priority for programmer trainee jobs, provided they passed the written tests. Final selections were made upon completion of the 8-1/2 weeks training.

VI. VOCATIONAL ADAPTION

The extensive training for new ADP jobs constituted an important step in preparing employees for the changeover, and in producing the skilled personnel needed to make the ADP system effective. More important perhaps for the individual was the opportunity it provided for getting a better job.

1. *Employee training programmes*

IRS already had considerable experience in training, with a professional training staff, and a training programme for practically every major occupation. Even so, training and retraining activities had to be expanded substantially with the introduction of new ADP equipment. A three-man group in the Washington headquarters was assigned to work full-time in planning and co-ordinating training programmes. A special training staff was also established at the Atlanta centre.

Retraining employees for new jobs was carried out in two phases. The first phase, on a voluntary basis and not related to a particular position, was designed to provide skills in accounting, income tax law, typing and shorthand. This training was given by correspondence and in classes after working hours. The second phase provided specialised occupational training after reassignment to a new job.

Classes in most district offices were open to all employees. Employees directly affected by the changeover, however, were encouraged, through personal interviews, to enrol in courses most likely to result in job placement. Those already enrolled in correspondence courses were advised to join the classroom sessions.

Training was based on the IRS home study correspondence programme, consisting of five courses in accounting and one longer course in income tax law. Only the two most elementary accounting courses were given by classroom instruction. Those employees who demonstrated special ability were encouraged to take the more advanced courses by correspondence.

Typing and shorthand training was given in only a few districts. It was not offered more widely because secretarial grades were generally lower than grades of affected employees. One district arranged for refresher training after hours at a local high school, and the IRS paid the enrolment fees. An after-hours course in office skills was established in one large office.

Temporary reassignments were used frequently to supplement classroom training and provide on-the-job experience. They were also valuable in evaluating the employees' potentialities in a new kind of work.

Temporary employees who were assigned to the more routine jobs generally received from 2 to 4 hours of formal training and some on-the-job instruction by working supervisors.

2. *Selecting instructors*

Instructors were selected from local IRS experts in accounting and tax law who volunteered. Employees with teaching experience or with special IRS instructor training were preferred. Those selected were given an IRS training course in " Principles and Methods of Instruction " by the regional training officer; this consisted of 40 hours of classroom instruction and practice teaching.

Initially, all districts compensated their instructors with time off in return for time spent teaching. Later, payment of instructors' travel expenses and overtime pay was authorised because compensatory time off was not possible in some offices.

3. *Training for ADP jobs*

An extensive training programme was set up for persons selected for ADP positions — especially systems analysts, administrators and programmers.

Systems analysts, for example, received 10 weeks of full-time classroom training, 4 weeks of observation of processing operations in a district office and a service centre, and 3 weeks on-the-job training in the Statistics Division at Washington. The training of programmers consisted of 9 weeks of formal classroom lectures and practice problems, and 40 weeks of on-the-job training.

VII. PROBLEMS OF ADJUSTMENT

Certain manpower problems arose in the Atlanta region during the first half of the conversion period. Information about them was obtained from personal interviews with affected district employees and managers. No survey of employees was made to determine the extent of these problems.

1. *Lack of mobility*

Unwillingness to transfer from district offices to the Atlanta Service Center was one of the problems. Personal difficulties were reported by some employees as discouraging them from accepting new jobs. Among the reasons given were reluctance to sever close family ties, spouses' employment, and health and age problems. Forced sale of their homes at a loss and higher living costs at Atlanta were cited by some. Some employees stated that their moving expenses could not be fully compensated by the Government. In some instances, transportation and related charges exceeded the maximum payable by the Government.

Within the city of Atlanta, some jobs were transferred from the local office in downtown Atlanta to the new service centre in the suburbs. A survey of the local office revealed that about 44 per cent of the employees were unwilling to transfer, some because of the longer commuting distance and inadequate public transportation.

Some employees felt that the advantages of transferring to the service centre more than offset problems of relocating. The advantages of promotion upon transfer, better opportunity for advancement, and more interesting and challenging work seemed to outweigh inconveniences.

2. *Maintenance of adequate communications*

Providing a flow of information concerning progress of the conversion, especially between national, regional, and local offices, constituted a complex problem of administration. When communications were slow, rumours and uncertainty spread among employees and supervisors.

In retrospect, some officials felt that the policy of frequently assuring employees that, if at all possible, no one would suffer any hardship, resulted in an undue amount of complacency about the change and a tendency to postpone decisions. By mid-1961, Washington officials were stressing that employees must take some initiative in retraining and accepting new work when jobs became available. Managers were cautioned not to delay reassignments until the later part of the conversion cycle.

3. *Placement problems*

Placing supervisors in jobs at comparable grade levels in the districts was another problem of the changeover. While there are a number of supervisory positions at the service centre, few district supervisors accepted transfer.

Particular difficulty was encountered in placing employees who were approaching retirement age and did not wish to transfer for a short period. The districts plan to reserve positions for such employees. Some older employees voluntarily transferred to the service centre, but felt anxiety about the change.

Employees in affected units who had only minimum skill presented a difficult problem. Officials expect that eventually some jobs may be redesigned to fit the qualifications of such employees. Since new hiring was restricted, some employees were considered for jobs for which they might otherwise have been rejected.

Finally, problems arose in reassigning experienced employees who were uncertain about their ability to learn new skills or disliked the kind of work offered.

4. *Training problems*

Retraining presented difficulties as well as opportunities. Employees were asked to attend classes after working hours — an obstacle for women with family responsibilities. Arrangement for transportation after classes also presented impediments.

It was sometimes difficult to arouse interest in after-hours training in typing and stenography, although some districts paid the cost of typing courses at local business or high schools. Among reasons given were family responsibilities, and the low-pay jobs and lack of promotion opportunities in this type of work. Administrators generally had no difficulties in recruiting competent instructors from among district employees for the accounting and income tax law courses, but typing and stenographic instructors were extremely hard to find.

Some employees reported that they felt compelled to take the training courses because non-participation might result in loss of a job, even though participation was entirely voluntary.

The usefulness of classroom training was also doubted. A few employees did not believe that the courses had increased their placement potential or helped in performing their new job duties. Others, however, especially those already placed, considered the training very helpful.

While some administrators reported that many employees learned faster by attending classes than by correspondence, some employees complained that the classes were too difficult and covered the subjects too rapidly.

One drawback to the unrestricted admission policy for training was that it sometimes admitted employees who were not well suited for the particular course. The IRS preferred, however, to rely on counselling and persuasion to guide individuals into the training most likely to result in reassignment to permanent jobs. Few dropouts have been reported.

5. *Stresses*

Some instances of considerable stress arising out of the changeover were reported. One district manager stated that activating the service centre produced periods of intense pressure for supervisors and employees when overtime was required to continue the work at the same pace. Some officials reported difficulty in meeting workload deadlines, an unusual amount of employee illness, and employee frustration due to changes in procedure.

Although temporary employees filled in to keep critical operations moving, one manager reported that more supervisory attention was required, and that a heavier workload was placed on those remaining.

Operation of electronic computers at the Atlanta Service Center involved putting a small number of employees on shift work. This requirement caused some candidates to reject employment offers.

6. *Recruiting specialised employees*

Only a small proportion of affected employees transferred to Atlanta from district offices, and management had difficulty in obtaining qualified employees to fill Atlanta Service Center positions.

Recruiting qualified card punch operators, especially for part-year employment, was difficult. Because of the low entrance grade and routine nature of the work, there was little interest among affected employees in transferring to Atlanta for these jobs. There was also competition from other Government agencies and private firms for qualified card punch operators.

Another problem was recruiting sufficient experienced tax examiners from the district offices for Atlanta. These positions required a knowledge of accounting and experience in IRS operations. Although a number of tax examiners have transferred from the districts, the response has not been as great as IRS officials expected.

Case II

CHANGED MANPOWER NEEDS IN CONVERSIONS TO DIAL TELEPHONES

I. INTRODUCTION

This report describes the methods applied in three United States telephone companies in planning manpower adjustments associated with the conversion of telephones from a manual to a dial system. Such conversions usually result in an immediate decrease in the work load of operators at the office affected. The companies have developed over many years planning procedures that try to minimise displacement of the work force. Although these plans were formulated as part of each company's personnel and technical programme, they are subject to modification as a result of contractual obligations and union agreements with employees. The companies are part of a nationwide telephone system, and follow similar procedures.

The study was based largely on records and documents outlining company policies regarding employee problems in conversions. In addition, changeovers at five offices were surveyed: two located in large metropolitan areas; and three in smaller cities. Officials of the companies and two unions representing the employees affected were interviewed to supplement the information obtained from records.

The three companies studied have a long history of adjustment to technological change. The changeover from manual to dial systems at the five cities — in the late 1950s and early 1960s — was among the last conversions to be made in the companies. Dialisation in the industry began several decades earlier but because of the depression, the interruption of World War II, and post-war shortages of trained men and equipment, dial conversion had been delayed in some areas. In the meantime, the three companies had taken the next steps in telephone mechanisation — the introduction of direct distance dialing (DDD) and the installation of automatic message accounting (AMA) — changes which have been adopted on a wide scale. The conversion at the five cities, therefore, covered both stages — DDD and AMA as well as local dialing — so that the impact was greater and the planning and adjustments were more extensive than usually required in conversions.

II. TECHNICAL CHANGES

Technical preparations for dial conversions are complicated and require at least two years. Although the technology of dial telephony is well established, the installation at any particular community is a tailor-made undertaking involving considerable engineering planning on the part of the telephone company and the manufacturer of equipment.

Current and future communication needs of the community are surveyed, decisions made with the equipment supplier about type of equipment to be used, and tentative schedules for installation established. For example, preparing the specifications for manufacture and assembly of dial equipment in one conversion required five man-years of engineering work. The equipment supplier has the major responsibility for engineering, production and installation. Finally, the actual installation of new dial equipment is time consuming, requiring in one case over 100 workers and over 750,000 wired connections. The installing of equipment at one office took eight months. Before the date of cutover (i.e., the start of customer dialing), training must be completed, office supplies put in place, customers informed and instructed, directories published, etc.

Thus, the complexity of the installation involving thousands of customers and the need for the greatest care to assure maximum reliability requires a long leadtime which affords management opportunity for planning manpower adjustments.

III. PRINCIPLES OF MANPOWER PLANNING

Manpower planning in connection with dialisation usually begins with the announcement of the decision to convert to dial. Planning objectives, as set forth in a manual on dial conversions, are as follows:

1. "To retain as many as possible of those who wish to continue to work.
2. "To place in suitable positions those whom it is necessary to transfer.
3. "To avoid reducing in rank any regularly appointed non-management employee with a title above that of operator.
4. "To avoid a surplus after the cutover".

Applying the programme for carrying out these objectives is the responsibility of the manager of the local offices affected. Since other offices within the company may be involved, other officials have the obligation of collaborating and co-operating on some phases. Where the change is extensive, it has been found necessary sometimes to designate one individual to carry out, on a full-time basis, the entire programme.

The extent of planning that is necessary depends to some degree on the type of office. In large cities where dial cutovers are on a gradual basis, the impact at any one time is relatively small and employees who lack a job after the change can usually be absorbed in other offices within the city and in non-operating work in the traffic and other departments. In towns with only one office or in changeovers that take place within a short period of time, conversion may involve more difficult problems of employee placement and relocation.

Timing to a considerable extent also has an important bearing on the success of the cutover. It has been found that a change before the busy season will generally result in fewer persons who will immediately have no jobs because of the need for extra people to handle the peak traffic volume. A cutover late in the year makes it difficult to take advantage of the need for extra people to take the place of those on vacation. Establishing a convenient cutover date is therefore important in planning.

Adjustments are facilitated by the fairly high rate of turnover among women operators who constitute virtually the entire group affected by the changeover. Telephone operators are typically recruited from among recent high school graduates, many of whom leave after marriage or seek other employment. Many operators, however, rely on permanent jobs with the telephone company as their main source of livelihood and job security is of primary importance.

Another factor facilitating adjustment is the steady growth of telephone services. Although expansion of dialed services does not immediately involve additional operators, the growth of person-to-person long distance calls, collect calls, and similar special service calls, requiring the intervention of operators, opens up some job opportunities for those displaced by dial conversions.

IV. Assessment of manpower requirements and adjustments

In developing a manpower programme for the conversion the companies have to make three basic estimates:

1. The number of employees in the office immediately before the cutover.
2. The number of employees required immediately after the cutover.
3. The number of employees required during the several months following, which may be lower than immediately after conversion.

The difference between (1) and (3) is the probable number of persons who will no longer have jobs in the offices affected.

In the preparation of these estimates one of the first steps is developing estimates of future work loads of toll business. Such forecasts based on homebuilders plans, business surveys, etc., are made by company engineers for several years ahead and are reviewed at Forecasting Conferences every few months. Job requirements under the new dial system are estimated on the basis of these estimates and the past experience of other companies in the system. Standard descriptions of jobs under the new system are available together with personnel and training requirements.

On the basis of information from employee records and established practice regarding seniority in the companies, employees are classified into three groups:

a) Employees who will remain in the new office. (These include employees with longest seniority.)

b) Employees for whom positions may be available in the new offices or in other offices or departments.

c) Employees for whom it is likely that no positions will be available.

Another important step in planning is interviewing employees to inform them of their status and to obtain information about their own plans regarding retirement, moving, resignation, transfer, taking leaves of absence, etc., and the type of work desired after conversion. This information, together with data on work experience, seniority, etc., is used in planning the adjustments that must be made to assure placement of each individual after the conversion. As soon as the status of each employee after the conversion is determined, specific information is provided.

The initial programme is kept up to date by frequent review. Changes in traffic volume, changes in work per call, and changes in installation schedule may require review of the entire programme. Generally, the programme is reviewed at three-month intervals until a year before the cutover. During the last year reviews on a monthly basis are ordinarily made.

V. INFORMATION AND CONSULTATION

The companies regard the provision of specific and advance disclosure of the employment effects of the changeover as an important principle of their manpower planning. Management officials, the union, and employees, in that order, were informed prior to announcement of plans to the general public. Management employees in the traffic department — chief operators, assistant chief operators — and employment office personnel were first informed because of their involvement.

The companies consider it desirable to inform the union adequately, and preferably in advance of an announcement to the employees and the public, " so that there will be no misunderstanding and so that questions or discussions among the employees, if taken to the union, may be given answers in accordance with the facts ". Employees were informed promptly after the union was advised.

The policy is to give both union and employees the same information about the changeover. Among the items covered are: the expected date of the cutover if only one cutover is concerned; or the dial conversion schedule if more than one office is involved; plans prior to the cutover regarding the need to keep the total work force at a minimum and the hiring of temporary employees; and plans for placing employees who may not have a job after the cutover. The information given is as specific as possible, covering the employees who may be affected and possibilities to be considered for them. The policy is to make maximum efforts to retain employees in the company and to avoid down-grading any regularly appointed non-management employee.

This information is given to employees in a general announcement. In addition, it is the policy to give employees facts about the change, in small groups or on an individual basis, with opportunity provided for questions. In one case, a pamphlet describing the conversion was distributed to employees by the company. At another changeover, the local union prepared a pamphlet presenting answers to frequently asked questions about the conversion, with the objective of clearing up " questions, rumours, and misunderstanding ".

Consultation with employees and unions is carried on throughout the conversion, to supply additional information because of changes which may have occurred in plans and to discuss problems of the changeover. Table 1 summarises the highlights of union-management meetings at one office held over a 16 month period prior to the cutover.

The collective bargaining agreement at several offices provided a 30-day period from the date of notification of the decision to install new equipment to negotiate any special arrangement for manpower changes that departs from the written contract provisions. If special procedures were not worked out during this period, the general contract provisions regarding seniority during layoff and termination allowances applied. At the first meeting in one office, for example, management provided union representatives with estimates of number of employees required before and after the changeover, estimated number of retirements, resignations, etc., and proposals to transfer employees.

At later meetings, alternative methods of handling layoffs that departed from the written agreement were discussed. The union's objections to the management proposal for part-time work were finally accepted and contract provisions providing for termination with pay were put into effect.

TABLE 1. OFFICE C: CHRONOLOGY AND HIGHLIGHTS OF UNION-MANAGEMENT MEETINGS

MATTERS DISCUSSED

16 Months Prior to Cutover:

Assured employees that all surplus operators would be offered transfer to offices elsewhere within the state.

Informed employees that transfers would likely be undertaken as near to time of conversion as possible, that volunteers would be accepted first, and that the balance of transferees would be those with the least seniority.

Advised employees that, starting within a few days of the meeting, employees affected would be interviewed to discuss their situation and amenability to transfer.

Answered numerous questions by employees relating to outlook for employment and criterion for retention or transfer.

15 Months Prior to Cutover:

Reviewed procedures used to determine employees likely to be retained and the rights and outlook for those not needed after cutover.

Reviewed results of management interviews with 155 employees: about 98 declined transfer, 49 would transfer, and the balance were uncertain at time of interview. Revealed geographic locations selected by transferees.

10 Months Prior to Cutover:

Discussed questions related to leaves of absence, interdepartmental transfer, overtime work, and state unemployment benefits available to those declining transfers.

4 Months Prior to Cutover:

Discussed a suggestion that the first five employees below the cut-off point for retention based on seniority be reassigned for about six months to the Plant Department.

Discussed timing of vacations relative to cutover date and stated that the company was considering scheduling vacations to avoid layoffs. This would help absorb the force in this period in the expectation that traffic growth and force turnover would nullify the surplus.

Discussed arrangements for employees desiring a transfer to an office located in a neighbouring state serviced by another telephone company. A representative from that office attending the meeting announced special benefits involving payment of transportation and board and lodging as inducement for qualified employees to transfer.

Answered questions related to layoff pay for employees not qualifying under the company-union contract. Discussed payment of transportation expenses (other than those described above) and announced that these benefits could not be paid.

3 Months Prior to Cutover:

Answered technical questions relating to layoff pay for employees in special situations.

Frequent informal contacts relating to force arrangements, transfers, etc., in connection with the cutover.

VI. PLANNING FOR MINIMISING EMPLOYEE DISPLACEMENT

Plans to minimise displacement of employees involve primarily measures for reducing staff by natural wastage, and for transferring employees whose jobs are scheduled to be eliminated to other jobs within the company. However, the companies are also concerned with keeping the number of regular or permanent employees who would have to be transferred to a minimum and have, therefore, developed various personnel planning procedures to speed up natural wastage without disturbing normal services during the pre-cutover period.

1. *Preconversion manpower planning*

Several devices are used to avoid engaging permanent employees to fill vacancies that develop prior to the conversion, including: postponing vacations and leaves of absence until after the change; spreading training and educational activities over a longer than normal time period; reducing worktime per call; curtailing absences; and providing overtime. The effect of these measures is to reduce requirements for permanent employees before conversion but to increase them after the changeover takes place. The period for reducing the work force through normal turnover is thereby lengthened.

The policy of the companies is to encourage employees who plan to retire or resign to defer their action until after the change. Employees are frequently borrowed from other offices to carry on temporary assignments, with the proviso that they will return after the conversion to their own office. Both these sources make it possible to carry on operations before the changeover without hiring employees from the outside who would have to be released after the changeover; it also provides for postponing terminations until after the change takes place so that operators who may not have a job because of the cutover might be absorbed into other work.

In practice, however, companies have often found it necessary to hire additional employees in order to operate normally before cutover. Table 2 shows the extent of temporary hiring and overtime prior to changeover at one office. Besides the normal workload during this period, additional work must be completed to get ready for the conversion. However, all hiring in an office to be converted, beginning one year prior to the cutover, is done on a temporary basis. Preference is given to ex-employees who do not need training and who do not desire permanent positions. Persons hired on a temporary basis are not necessarily covered by the measures to protect their job security as are regular employees. They may, however, be hired on a permanent basis if openings occur after the changeover.

2. *Transfers and reassignment*

The most important measure for protecting job security is the offer to transfer employees who will have no jobs in the dial office after conversion. Normally, many possibilities may be developed for transferring such employees after the cutover to other central offices and to other work in the traffic and other departments. According to the manual on conversion used by the companies, the underlying basis for this procedure is as follows:

TABLE 2. OFFICE B: ANTICIPATED USE OF REGULAR AND TEMPORARY EMPLOYEES AND OVERTIME PRIOR TO CUTOVER, BY SELECTED MONTHS

MONTHS PRIOR TO CUTOVER	ESTIMATED FORCE REQUIRED	ESTIMATED TOTAL NUMBER OF EMPLOYEES AVAILABLE	ESTIMATED FORCE COMPOSITION				ESTIMATED OVERTIME	
			REGULAR EMPLOYEES		TEMPORARY EMPLOYEES		EQUIVALENT EMPLOYEES REPRESENTED BY OVERTIME	PERCENT OF TOTAL FORCE
			NUMBER	PERCENT OF TOTAL REQUIRED	NUMBER	PERCENT OF TOTAL REQUIRED		
18	218	218	218	100	0	–	0	–
12	208	190	185	89	5	2	18	9
11	218	196	183	84	13	6	22	10
10	225	204	182	81	22	10	21	9
9	227	214	181	80	33	15	13	6
8	235	218	180	77	38	16	17	7
7	221	221	179	81	42	19	0	–
6	222	222	178	80	44	20	0	–
5	224	224	177	79	47	21	0	–
4	225	221	175	78	46	20	4	2
3	226	215	173	77	42	19	11	5
2	230	209	172	75	37	16	21	9
1	225	203	170	76	33	15	22	10

NOTE. Because of rounding, sums of individual percentages may not equal 100.

> " ...in addition to the effect on the general employment situation it is better from a service and cost standpoint to retain experienced employees for whom a considerable investment for training has been made, than to engage and train new people in some places while laying off experienced employees in others. "

It is the policy to try to develop in advance possibilities for transferring employees after the cutover. Traffic Department jobs to which displaced employees have been reassigned include information and rate and route operator positions, both within the same office and at other central offices. Where other central offices are within reasonable travel distance of the office to be cut, the same procedures for using temporary employees, postponing retirements, etc., described above are sometimes applied to make openings for surplus employees from the converted office available at the time of the cutover. Factors considered in determining employees to be transferred are length of service, qualifications (if transfer to other work is involved), home address, and transportation facilities.

Transfers to non-operator jobs, such as clerk, in the traffic and other departments are also made. To facilitate such transfers, other departments may also put into effect the measures described above to assure openings after the cutover. In arranging for transfers to other departments, the company has found it desirable to make available as wide a selection as possible, to consider opportunities for transferring management personnel, and to encourage other departments to consider modifications of their acceptance standards, if necessary, with respect to such factors as age. In discussing possible transfers with employees, the nature of the job, location, training as well as seniority, pay and hours are covered.

Finally, voluntary transfers to distant cities are sometimes used to take care of employees for whom no local position can be found. Such transfers are usually arranged long in advance of the cutover. Distant offices are encouraged to accept employees who are affected by dial conversions. (Transfers, however, are not encouraged if they add to any surplus employment or if they may adversely affect present employees.)

In one office, all employees affected by the conversion, including those who would be retained in the office after the changeover, were interviewed before the changeover regarding their willingness to transfer to nearby towns. Of the entire group, one-third agreed to transfer. They were given an opportunity to select from a list of available locations on the basis of company seniority. In one instance those who transferred to a large city with a great demand for operators were paid special moving allowances, including transportation and two weeks lodging and food.

Employees who transfer to other offices within the same company or to other companies within the same telephone system carry their pension rights with them. They may count their years of service for purposes of layoff and length of vacation but not for choice of shift and date of vacation.

3. *Training in conversions*

Training of operators who are retained to handle toll calls and other duties under the converted system begins in advance of the changeover. Three weeks training is required to prepare operators for these duties. The company also trains employees transferred to clerical jobs. Employees transferred to toll operator or other jobs in other offices are given the same training.

Training programmes for toll operators are set forth in manuals prepared at the headquarters of the telephone company. The programme consisted primarily of practice in receiving and sending toll calls on an actual or a simulated switchboard. The pace of training is adjusted, to some extent, to the individual's needs, with older employees sometimes needing a longer period of training.

VII. ASSISTANCE TO DISPLACED EMPLOYEES

After the conversion is completed, some permanent employees may no longer have a job with the company because they do not wish to accept transfers to other jobs. In addition, temporary employees are subject to layoff in accordance with the understanding set forth at the time of hiring. Table 3 shows the disposition of affected employees at four offices where conversions were made. A variety of measures are utilised to assist employees to find work and to provide financial assistance while out of work.

1. *Job creation in company*

If the number of employees who cannot be transferred after all possible steps have been taken is small, it is the policy to retain these employees until suitable positions are opened up for them through normal turnover or in-

TABLE 3. DISPOSITION OF AFFECTED EMPLOYEES BY SELECTED OFFICE

EMPLOYMENT CHANGES, BY CATEGORY OF EMPLOYEE	OFFICE			
	NUMBER OF EMPLOYEES			
	A	B	C	D
Total affected, all groups	154	216	157	165
Regular employees				
Total number	126	158	157	165
Retained in department	91	115	40	0
Transferred to another department	1	0	4	0
Transferred to another office in the same city	0	0	0	132
Transferred to another city	11	27	42	0
Leave of absence	3	0	15	0
Retired	2	0	6	20
Resigned	0	3	11	13
Declined transfer; elected to accept termination pay.	18[1]	13	39[2]	0
Temporary employees:				
Total number	8	47	[3]	[3]
Transferred to another city	1	5	—	—
Laid off (work completed)	7	42	—	—
Occasional employees:				
Total number	20	11	[3]	[3]
Laid off (work completed)	20	11	—	—

[1] Of these 18 regular employees, one year after conversion, 6 had been rehired as regular employees, 3 were rehired as temporary employees, and 9 had been offered jobs elsewhere within the office but declined.

[2] Of these regular employees, an estimated 20 were rehired within 2 years of conversion.

[3] Temporary and occasional employees were not used.

creased traffic. This avoids the problem of laying off a few employees and shortly after needing to recruit and train others.

Methods used to create jobs for such surplus employees within the organisation involve: temporary assignment to other branches of the traffic department and to other departments, for special jobs; temporary assignment to other central offices, especially resort offices, to take care of peak loads; part-time employment especially for married women or for girls who wish to go to school; and supplementary training or training for different types of service.

2. *Assistance in securing employment*

To assist displaced employees to obtain jobs outside the company, the company personnel office often contacts other employers to determine possibilities and requirements. The possibility of placement in private branch exchanges is especially explored. The individual employee, however, must apply for any openings that are found. For example, in one case, a large supplier of electrical equipment was contacted and hired five displaced telephone operators.

3. *Termination allowances*

Only if no other suitable employment in the company can be found is the employee laid off. Under union agreements, laid off employees are paid termination or layoff allowances based on years of service with the company. In one union contract, for example, layoff allowances ranged from 1 week's basic pay for regular employees with 1 year's service to 30 weeks' basic pay for 15 years. For those with more than 15 years (a rare case), one week's additional wages are paid for each four months of service beyond 15 years. In one office, termination pay averaged about $ 350 per employee and ranged from about $ 100 to over $ 700. In addition to these allowances, laid off employees may be eligible for state unemployment compensation benefits.

Case III

HALVING THE WORK FORCE IN A PETROLEUM REFINERY

I. INTRODUCTION

In the United States today the petroleum refining industry employs more than 100,000 people, and ships some $ 15 billion worth of product. Petroleum refinery is a process requiring a large investment in production facilities of a highly-automated type. The annual capital expenditure in new plant and equipment averaged more than $ 4,200 per year per employee from 1954 to 1959, compared with an average of less than $ 600 per employee in all manufacturing industries.

The period after World War II saw vast changes in the petroleum industry. Its already advanced state of technology was further heightened by the introduction of automatic control systems.

During the period of innovation, many petroleum refineries became obsolete and a great number, particularly the older and smaller ones, were shut down. The number of operating refineries in the industry decreased from 361 in 1947 to 289 by 1961. Employment in the industry also declined.

This paper concerns a large, 75-year old refinery that underwent severe reductions in manpower as the result of modernisation.

The refinery is a major employer in a small community of 8,000, located in the ring of a large midwestern metropolitan area. For many years prior to the introduction of the renovative programme, steady expansion had afforded employees a high degree of job stability, enabling them to look forward to continuing years of " career " employment with the company. The voluntary quit rate was quite low.

It was in the 1950s that top management recognised the need to restore the company's competitive position in the industry. A thorough analysis of the refinery's situation revealed two major problems: (*a*) inefficient manning, and cumbersome management methods; (*b*) outmoded equipment in the refinery.

The management, starting in 1957, undertook a programme of technological change, including the construction of larger refinery units, extensive renovation of plant, equipment and operating methods, and the introduction of automated operations such as computer control of certain processes. One change involved the installation of a single towering 140,000 barrels-a-day crude oil distillation unit to replace ten smaller, less efficient units. Unprofitable small-volume items were eliminated from production. The craft shops were streamlined to provide a straight-line flow of materials. Materials storage space, toolrooms and offices were combined at one central location.

Older equipment was made more efficient by modification and addition. In 1958 the capacity of the refinery's catalytic cracking unit was increased between 50 and 100 per cent by installing a new gas compressor and surface condenser, and placing larger cyclones in both reactor and regenerator. Next, a vapour recovery unit was introduced to replace a gas absorption plant and coke still. Later, a new high-speed canning line was installed that filled and packaged 600 quarts of motor oil every minute.

More advanced computer controls were introduced. In 1959 an IBM 704 replaced the IBM 705 data processing system. The new computer could do scientific and technical calculations and could be utilised to control processes of some operating units, such as the new alkylation unit and the 140,000 barrel pipe still. The computer was later adapted to closed-loop control, which permitted it to adjust continuously as process conditions varied. Finally, it was replaced by a much larger and faster 7044.

A digital electronic system was devised to control the refinery's new facilities for blending gasoline. The inspection of hot lines in operation was made feasible by the use of ultrasonic equipment. Another computer was added, an IBM 1401, which prepared the data for the larger computer, and solved such problems as preparation of work lists for the turnaround of equipment. It also enabled management to establish a daily IPS (inventory, production, shipments) control which provided operating supervisors with information on how many units should be run to increase or decrease yields of various products.

By 1963, a new ultraformer, which reforms naphtha in a catalytic process to raise the octane number, was put under computer control. The use of the IBM 1710 control system assured optimum operation; the refinery achieved improved gasoline yield, better recovery of high-value products, and increased capacity.

All of these changes were completed within a six-year period, with an overall reduction in manpower from approximately 6,000 to 3,000 workers.

II. PLANNING AND EXTENT OF WORK FORCE REDUCTION

1. *Preparing management for the change*

Plans for the modernisation were projected over a six-year period. Technological feasibility and the human implications of the changes were both major considerations in the decision to spread the changes out over such a long period. From early in the planning stage, operating management and the industrial relations staff worked together on the human problems.

In the view of top management, one of the most serious obstacles to change was the attitude of the supervisory and management group, which was not sufficiently alert to the urgent need and opportunities for increasing efficiency. As a first step, therefore, the " profitability improvement programme " was launched. It stressed to all levels of the management organisation, including first-level supervisors, the necessity for improvements and increased profits. As a result, a climate conducive to modernisation was created, as was a consistent body of management thinking, planning, and action, aimed at dealing with change and the consequent employee dislocations. New approaches — for transfers, retraining, and outside job placement — also emerged.

2. *Assessment of new manpower requirements*

Although much of the modernisation programme did not involve drastic new types of technology, the introduction of new equipment into the refinery had significant manpower implications. This is well illustrated by the installation of one large refining unit, with one maintenance crew, to replace ten smaller units and ten maintenance crews.

It was the policy of management to avoid a forced reduction in personnel until it was quite clear that there was an overall shortage of work. Much of the new equipment did not differ radically from the old, except in its efficiency. Therefore it was possible to forecast post-conversion manpower requirements fairly accurately, and, with proper retraining, to use the capabilities of the existing labour force on the modernised processes.

At one point, however, it became apparent that an annual work force reduction of a few hundred redundant employees would be necessary before a new equilibrium could be established. Fortunately there were several reasons why the refinery could be flexible in timing layoffs. First, decisions concerning the size of reductions could be fairly arbitrary at any given moment, because they were attributable as much to new methods of organising work and utilising manpower as to the introduction of new machinery. Second, since there was a good deal of organisational " fat " at the refinery, management could schedule necessary layoffs over a period of years. Third, the fact that the refinery's equipment was being modernised made it possible for many employees, particularly those with maintenance skills, to be retained in erecting the new facilities. All of these factors helped the company to avoid serious internal labour difficulties as well as a sudden flooding of the local labour market.

3. *Timing of work force reductions*

Because of the extensiveness of the " profitability improvement programme ", all levels of management were involved in defining the required manpower adjustments within their jurisdictions, and there was careful coordination throughout between staff services, particularly engineering and industrial relations, and the line managers.

Based on the calculations of the engineers in charge of the modernisation effort, expectations of reduced manpower needs were communicated to the industrial relations staff, who then estimated the expected normal wastage in the refinery work force. When this did not appear likely to cover the necessary reductions in manpower, they devised programmes to encourage the early retirement of older employees. In this way, the number of employees who would have to be dismissed was minimised. This type of activity continued over the six-year period of the modernisation programme, at the end of which refinery employment had been reduced by more than one-half.

III. CUSHIONING THE EFFECTS OF CHANGE

1. *Communications*

Due to the " profitability improvement programme " notice of changes came as no shock to employees. But the permanent cut in manpower was completely unexpected. The first manpower reduction took place in 1957. Employees were told as early as possible, through the plant newspaper and through their immediate supervisors. The union was notified, and called a strike to try to prevent the layoff. However, management was firm and the union terminated the strike after a few days.

In an effort to overcome the initial resistance to change, management resorted to all media of communications to inform employees and the community of events and the company's efforts on behalf of terminated employees. The most effective communications devices turned out to be those related to the programme of helping displaced employees get other jobs. Each employee scheduled for layoff was notified far in advance, and an offer of help was extended in finding new employment. Those accepting help were interviewed three months before their scheduled layoff, and the interviews provided an opportunity to explain the need for modernisation.

Early consultation with the union also proved valuable. After the brief strike, the union turned its efforts towards co-operating with management in working out the programme to help displaced employees find new jobs. The union did not participate in the conduct of the programme, but throughout was kept informed of progress, and the union newspapers became one of the chief means of informing employees about outside job placements.

The entire programme undertaken by the company — communications, outside employment placement, and consultation with the union — was co-ordinated by the industrial relations staff, working closely with the plant manager. Though not all aspects of the communications programme worked smoothly, the company learned some valuable lessons — one of which was to guard against too early notification. At one stage management gave notice of a future reduction in manpower which, partly because of improved business, did not in fact take place. When, a year later, another such notice was given, neither employees nor their union took it seriously and were shocked when the layoff took place.

2. *Personnel redeployment procedures*

As we have seen, the six-year modernisation programme at the refinery resulted in a more than 50 per cent reduction in manpower. Personnel policies in the company had built on the belief in " career " employment and job stability, and personnel procedures were not geared to a large cutback in employment.

Before 1957, layoffs at the refinery were sporadic, involving only a few people at a time, most of whom were short-service employees; moreover, jobs were readily available in other expanding industries in the area. The 1957 manpower reduction, however, involved 400 employees, and those actually laid off included workers who had been at the refinery for up to four years. In 1958, 200 more employees were dropped, and in 1960, 400 more. Cutbacks continued through 1961, with the termination of 450 employees. By this time, workers with up to 11 years of service were being affected. The rate of reduction slowed down in 1962, when only 200 employees left the refinery. The last manpower cutback in January 1963, involved 450 employees. By this time there were few employees with less than 15 years of service at the refinery.

Many personnel redeployment procedures were utilised to minimise these separations and to help separated employees make a speedy adjustment:

a) recruitment was curtailed;

b) natural wastage was speeded up by encouraging older workers to retire early;

c) the forced reduction of manpower was staggered over a period of six years;

d) displaced employees received, in addition to unemployment compensation from the state, financial aid from the company in the form of separation pay and pension annuities;

e) employees facing layoff were permitted to leave before their scheduled termination date in order to accept other employment, without sacrificing their rights to severance pay;

f) the refinery's employment office acted as a placement service to help the laid-off employees locate new jobs;

g) long-service employees were protected from layoff by plant-wide seniority and retraining for new assignments if displaced.

3. *Natural wastage*

Since management's aim was to separate involuntarily as few employees as possible, it placed great emphasis on the use of natural wastage.

During the three-year period preceding the start of the modernisation programme no new employees were engaged. And throughout the programme employees were encouraged to leave of their own accord.

In particular, the company encouraged early retirement. Workers over 51 years of age were induced to retire early by the offer of a substantial " age allowance " separation payment, in addition to regular severance pay and annuity. This supplemental age allowance reached a maximum of $ 4,800 at age 58, being scaled down towards ages 51 and 65 respectively. A 58-year-old worker with 35 years of service could receive a total of about $ 8,000 by electing to leave.

The combination of severance pay and annuity induced a total of 1,139 employees to accept early retirement. This helped to preserve jobs for employees between the ages of 35 and 50 who had the heaviest family obligations. In some cases, older employees elected voluntary severance, but deferred receipt of their annuities for a couple of years in order to reduce the actuarial discount on them, and they used the separation allowance to tide them over until then.

The older the employee, the more likely that early retirement meant his complete withdrawal from the labour market. Men in their fifties, however, could often maintain accustomed standards of living by taking another job elsewhere and using the annuity to supplement lower earnings.

4. *Interplant transfers*

Although the parent company had no formal policy on interplant transfers, it did offer some transfers to its chemical plant 35 miles from the refinery. The fact that only a handful of employees accepted was attributed by management to the deep roots which employees had in the local community.

5. *Financial aid to the displaced*

In addition to their severance allowance, employees who were laid off received their accumulated vacation pay, and a full settlement of their accounts under the company savings plan. Those who had participated for ten or more years in the company's retirement plan, and who chose to become annuitants, were eligible to continue their hospitalisation, extended medical, and life insurance coverage.

Displaced employees were also eligible to participate in the company's educational assistance programme, whereby they would be reimbursed for 75 per cent of the costs of training for other jobs. In fact, very few employees, young or old, took advantage of this offer.

A large number treated the severance allowance as a windfall, using it to make major purchases even before they became re-employed.

6. *Job placement programme*

There was little response to the company's offer to provide opportunities for displaced employees to run their own gasoline stations or to work in company-owned stations in the area.

Many of the displaced were able to find new jobs through their own efforts, and only a minority accepted the company's offer of help. These were interviewed three months before their scheduled layoff, and their skills, interests, and experience were evaluated. This information was then kept available for transmittal to some 600 employers in the area who had been contacted by the refinery's industrial relations department. Two private employment agencies were hired by the company to supplement the activities of that department, and the company paid their placement fees. The efforts of these agencies, however, were far less productive in finding the displaced new jobs than those of the company's own employment office.

The actual placement activity was highly successful. It was not possible to keep accurate records, but it is known that 538 workers were placed in jobs directly through company assistance. Beyond this, many employees made contacts through the programme that led to eventual, though not immediate employment, and the management estimates that at least 1,100 of the displaced employees, approximately one-third of the total that left the refinery in the six-year period from 1957-1963, were assisted in locating their new jobs through the outside job placement programme.

Many employees at first refused jobs that did not pay as much as they had been getting, and others even rejected jobs of comparable pay simply because they would necessitate a longer drive to work. Refinery management felt that the number of placements would have been higher had workers been more zealous about accepting employment immediately.

For most of the displaced employees, the new jobs were in other manufacturing industries in the local area. A steel mill in the vicinity, for instance, engaged more than 600 of the former refinery workers during the six years. A significant minority of the displaced, however, went into the more rapidly expanding non-manufacturing sectors of the economy.

As far as can be determined, more than two-thirds of those re-employed elsewhere found jobs roughly comparable in pay to those from which they had been displaced. This does not mean that they were equally well off, for they had undergone various periods of unemployment, and had suffered a loss of accumulated seniority, plus the generally more liberal benefits available at the refinery. The less the education and skill of the worker, the more likely it was that his wages would be lower on a new job. For roughly half the re-employed group, their new jobs became permanent ones, and for the rest, the new jobs were transitional until better ones became available. About three-quarters of the displaced were unemployed for relatively short periods before finding new jobs.

Two key factors affected the success of the outside job placement programme: the labour market situation and the characteristics of the laid-off workers. The unemployment rate in the local labour market fluctuated at between 4 and 10 per cent during the period of layoffs, but most of the time, it remained below 6 per cent. When local unemployment was low it was relatively easy for the displaced employees to find new jobs, but when recession set in and unemployment climbed, the percentage of placements declined precipitously.

The second factor concerned the educational background, skill and age of terminated employees. Here the refinery was in a very good position. Since seniority had governed layoffs, the displaced tended to be in the younger age groups generally preferred by employers. But even the older ones fared well. The refinery had had high standards of selection, and in the years immediately preceding the modernisation programme, had engaged only high-school graduates. Therefore, most of the displaced were adequately equipped in education. Moreover, refinery employees, particularly the large proportion of craftsmen among them, had been trained in skills which were easily transferable to other industries and were in demand in the labour market.

The company made little use of government agencies or facilities in planning for the redeployment procedure, preferring to rely upon its own contacts with other employers in the area. There was some co-ordination with the public employment service concerning labour market information but this was minimal. Co-operation with the state employment service was largely ignored and viewed as impractical because of its reputation of having to match " hard-to-place " workers with " hard-to-fill " jobs.

7. *Vocational adaptation, job design and retraining*

Under the company policy of plant-wide seniority, employees with the least seniority are dismissed when lay-offs are necessary, regardless of what jobs they perform. The remaining employees are then invited to bid for the vacated positions, even though extensive retraining may be required.

On this basis a large proportion of the refinery's labour force was transferred from one department to another and from one job to another during the modernisation programme. Although management very early concluded that the skills within the existing labour force were sufficient to man the modernised process, 889 employees were retrained for new assignments. Special training was provided, for example, in the following occupations: operator, technician, engine mechanic, welder, boilermaker, and auto and crane mechanic, as well as in such lines of promotion as extraction and heating, filtering oils, heavy oil stills, pressure stills, and crude stills.

Employees were carefully selected for retraining on the basis of experience, and ability to pass qualifying tests including psychological screening. They also were intensively indoctrinated concerning their forthcoming training. The company set no age limit, and men up to 58 years old enrolled.

An unusually large proportion of those retrained for operating jobs were maintenance employees. This was because many senior employees had sought maintenance occupations in order to become skilled craftsmen and to avoid shift work. Thus, most of the first 220 employees to undergo formal retraining came from mechanical crafts, or from the labour pool, and were not well equipped to become refining-unit operators or laboratory technicians. These men went through 40 to 80-hour courses, on company time, covering such topics as refinery operations, instrumentation, heat transfer, distillation, and pollution control. Classes were small and taught by refinery supervisors. Training devices included specially prepared textbooks and motion pictures, film strips, demonstrations and field trips. The men were then given specific job manuals, and assigned to several weeks of on-the job training in their new specialities.

The retraining problem became more complicated as layoffs skimmed off the cream of the young employee force, leaving on the payroll a large number of those employees recruited during the tight labour market years of World War II when normal selection standards had been relaxed. Many of these employees had great difficulty in mastering new job assignments.

On the whole, however, retraining results were good. Although the retrained employees did not immediately perform as well on their new jobs as those they had replaced, they eventually did as well, and sometimes even better. In some cases, retraining resulted in dramatic upgrading. One employee who had spent 16 years as a plant guard was reassigned to run an array of compressors used in converting atmospheric nitrogen and waste refinery hydrogen into ammonia. More often, however, employees were retrained for jobs similar to their previous ones.

The refinery training incorporated some interesting experimentation with new teaching techniques, including simulated models and programmed learning. One of the simulated models used was an instrument control trainer, which operated in conjunction with Engineering Research's analog computer. A programmed learning course was established to enlarge the process operator's knowledge and increase his versatility in line with the demands of the new technology. Enrolment was voluntary, and each operator progressed at his own pace. The responsibility for training was placed on line management, but the actual training techniques were devised by the industrial relations staff. Training materials were provided by the company. It was left to the operator to find his own time for studying, but management did not object to his using working time, as long as this did not interfere with the performance of assigned work. Employees taking the course surpassed by 50 per cent the goals set by management. The refinery training director is enthusiastic about the potentials of programmed learning in training.

8. *Salary and wage administration*

The refinery management believes that employees should be paid on the basis of work performed. Therefore, no attempt was made during the modernisation programme to maintain the former wage rates of employees reassigned to lower-grade jobs. Also because of the extensive job re-shuffling involved, it was highly impractical to red-circle wage rates and at the same time maintain a consistent internal wage structure.

The refinery has never operated any incentive wage plans. Wage rates are established through job evaluation, and rates for new or changed jobs have been raised only when job requirements were increased.

At the conclusion of the modernisation programme the average job grade was the same as pre-modernisation. Fully 65 per cent of the production and maintenance workers at the refinery were in jobs at the same wage grade as formerly, regardless of whether or not they had been reassigned to new jobs. The 35 per cent for whom reassignment had meant either up-or down-grading was evenly divided.

IV. EVALUATION OF THE REFINERY'S APPROACH

The experience of the refinery points up the essential role of careful advance planning by management to reduce the unfavourable impact on employees when large-scale reductions in manpower are necessary. In this case, the need to lay off employees was minimised by the refinery's policies of curtailing recruitment, easing older workers into retirement, and by careful timing of change and the use of refinery personnel in constructing the new equipment, so that the reduction in force could be spread out over a long period of time. Long-service employees were protected against layoff by plantwide seniority and by management willingness to retrain them for new assignments. Employees who had to be laid off were given generous allowances intended to tide them over until they found new jobs, and the company helped them to find alternative employment.

The outside job placement programme proved well worthwhile, even though its success was influenced largely by external factors beyond the control of the refinery. It reduced frictional unemployment by fitting together available jobs and displaced workers more quickly and efficiently than would have been possible through the normal workings of the labour market.

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